

BOTANICAL ABSTRACTS

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- Entry 90. *For Le Plastrier, G. M. read Le Plastrier, C. M.*
- Entry 225. *Follow the words flux (eighth line from end of abstract) and cross-breeding (last line of abstract) by quotation marks.*
- Entry 234. *For Brierly, W. B. read Brierley, W. B.*
- Entry 330. *For 39¹: read 39²:*
- Entry 373. *For Bixby, W. C. read Bixby, W. G.*
- Entry 592. *For Mooyen, A. M. read Nooyen, A. M.*
- Entry 630. *For Sherrard, L. C. read Sherrard, E. C.*
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J. R. SCHRAMM, Editor-in-Chief
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Vol. IX

AUGUST, 1921

No. 1

ENTRIES 1-576

AGRONOMY

C. V. PIPER, *Editor*

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1. ANONYMOUS. El abrojo grande. [Cocklebur] Defensa Agric. [Uruguay] 1: 10-12. 1920.—*Xanthium* sp. as a weed.—*John A. Stevenson*.

2. ANONYMOUS. El maiz para semilla. Ventajes de la seleccion de las espigas. [Seed corn. Advantages of selecting ears.] Defensa Agric. [Uruguay] 1: 295-300. 10 fig. 1920.

3. ANONYMOUS. Field experiments, 1920. Jour. Dept. Agric. Ireland 21: 53-68. 1921.—Average results are presented of: Variety tests with barley, potatoes, mangels, oats, turnips, and wheat; fertilizer tests with potatoes, mangels, oats, and wheat; cultural tests with potatoes; and weed-spraying tests in oats. Comparisons are made with previous year or years.—*Donald Folsom*.

4. ANONYMOUS. La papa y su cultivo. [Potato culture.] Defensa Agric. [Uruguay] 1: 2-6. 1920.

5. ANONYMOUS. Potatoes.—Varieties immune from black scab or wart disease. Jour. Dept. Agric. Ireland 21: 108-112. 1921.—Some immune varieties are satisfactory in regard to yield. Yield rate and immunity of a number of varieties are given.—*Donald Folsom*.

6. ANONYMOUS. Report of the work of the seed propagation division for 1920. Jour. Dept. Agric. Ireland 21: 38-52. Fig. 1-4. 1921.—Results of pure-line culture and variety tests of wheat, oats, barley, and flax are described. Covered smut (*Ustilago hordei*) of barley was eliminated by steeping the seed for 10 minutes in a 5 per cent solution of formalin.—*Donald Folsom*.

7. ANONYMOUS. The non-setting of the uba seed. South African Sugar Jour. 5: 131. 1921.—Success with cross pollinating flowers of sugar cane and raising of seed in Natal and Zululand cannot be expected with our present knowledge as the anthers appear to have lost the power to open. The pollen is remarkably scanty in the anthers; such pollen grains as are present are irregular in size and devoid of starch whereas normal cane pollen is spherical and rich in starch. From these latter facts the conclusion is drawn that the pollen is sterile.—*E. K. Tisdale*.

8. ANONYMOUS. The R. A. S. field wheat competition. Agric. Gaz. New South Wales 32: 185-190. 1921.—Of 54 original competitors 24 voluntarily withdrew. Fields were scored according to trueness to type and purity, freedom from disease, evenness, cleanliness, condition and appearance, and apparent yield. A field of Hard Federation sown May 6 on summer fallow at 45 pounds per acre with no fertilizer won first place.—*L. R. Waldron.*

9. ARNOLD, J. H. Farm practices in growing wheat. U. S. Dept. Agric. Yearbook 1919 123-150. Pl. 5, 20 maps. 1920.—A geographical presentation of farm practices in wheat growing in the U. S. A. The practices used in preparation of seed bed, sowing, harvesting and threshing, have a rather definite adjustment to areal factors of climate, soil, and topographic features. Local variation in factors causes an adaptation of methods. Practice suitable for any given areal conditions cannot be transplanted unmodified to another area but helpful suggestions may be secured.—*C. J. Shirk.*

10. BECKMAN. Neuere Erfahrungen über Strohaufschliessung und Lupinenentbitterung [New experiments in treating straw and in removing the bitter principle from lupines.] Mittel. Deutsch. Landw. Ges. 36: 145-146. 1921.—After a brief summary of the older attempts to treat straw to make of it a more digestible feed, the author describes his own method. The straw is treated with soda combined with hydrated lime. The process is carried on in a patented apparatus without artificial heat. This apparatus is described and an estimate of expense given by an engineer, BAETKE of Charlottenburg. Out of 100 kg. straw, 80 kg. "Beckman straw" are obtained, with a starch value of 56 kg. The details of the quantities of soda and lime are not given but Baetke claims that at a total expense of 70 M. for raw material and labor a feed worth 275 M. may be secured. To the costs should be added the royalty for the use of the patent, which is fixed at 70 M. per head of cattle payable once (einmalige Abgabe).—*A. J. Pieters.*

11. BIPPART, E. Erfahrungen in Ackerbau zur Überwindung der Kriegschäden für Gross- und Kleinbetrieb. [Experiences in agriculture for overcoming war damages by large and small estates.] Landw. Hefte 44/45. 74 p., 4 fig. 1920.—A series of agricultural essays by an experienced farmer. The subjects discussed are as follows: 1. Agricultural production. Nutrition of plants and their ingredients. 2. The difficulties of managing sandy lands and how to overcome them. 3. The difficulties of cattle raising on sandy land. 4. The management of moor lands and the Rimpau-Cunrau system. 5. Practical agriculture on stiff soils. 6. What results have the scientific investigators secured as regards fallowing? 7. How can the nitrogen requirement of winter grain on stiff land be met without manuring? 8. Soil bacteria. 9. Management of stiff soils without livestock. 10. The art of agriculture. 11. Practical rotations with fallow, clover, and hoed crops. 12. How can tillage be conducted to bring about a restoration of a brisk and strong soil fermentation. 13. Conclusion.—*C. V. Piper.*

12. BOVELL, J. R. Report on the Department of Agriculture, Barbados. Rept. Dept. Agric. Barbados 1917-1918: 51 p. 1920.—From a summary of the results of experiments with sugar canes during the period 1916-18 it appears that B. H. 10 (12), Ba. 6032, and Ba. 7924 have maintained a high standard of yield and that the newer seedlings, such as B. S. F. 12 (45) B. S. F. 12 (34), B. S. F. 12 (27), and B. S. F. 12 (24), are deserving of extended trials under plantation conditions. The results of manurial experiments with sugar-cane were rendered of little value by the attacks of *Diaprepes abbreviatus* L. and *Phytalus smithi* Arrow.—Two series of experiments with cotton are reported: (1) An effort to improve Sea Island and certain indigenous and other varieties of cotton by the selection of the best formed plants giving heavy yields of good-quality lint; (2) by similar means to improve a number of hybrid cottons obtained from crossing improved varieties with indigenous cottons.—The Barbados cassava (*Manihot utilissima*) seedling No. 101 gave a mean return per acre of 11,026 lbs. over a 5-year period. Results of experiments with *Xanthosomas* and *Colocasias* prove that better returns are obtained when the former are planted from corms and the latter from cormels. Variety experiments with a number of legumes, yams, and three fodder plants are also reported. Figures are given for the sugar and cotton crops.—*J. S. Dash.*

13. BREAKWELL, E. Further reports on Shearman's clover. Agric. Gaz. New South Wales 32: 167. 1921.—Kew authorities announce plant to be *Trifolium fragiferum* var. Notes on its behavior are given.—L. R. Waldron.

14. BREAKWELL, E. Popular descriptions of grasses. Agric. Gaz. New South Wales 32: 191-196. 3 fig. 1921.—Descriptive notes are given of *Stipa setacea*, *S. scabra*, *Aristida Behriana*, and *A. leptopoda*. Other species are mentioned. Seeds of the 2 *Stipa* species germinate 48 hours after rains. The 2 grasses start very early after dormancy and resist drought in summer which makes them valuable for dry-land pastures.—L. R. Waldron.

15. BROOKS, A. J. Report on the Agricultural Department, St. Lucia. Imp. Dept. Agric. West Indies Rept. Agric. Dept. St. Lucia 1918-19. 32 p. 1920.—Notes are given on: *Pyenostachys dawei*, a handsome blue-flowered labiate from Uganda, Guayaquil cacao, now in great demand on the British market and of which seeds have been received for trial; *Ilex paraguayensis*, extensively used as a tea plant in Paraguay; and *Nephelium lappaceum*, which bears the Rambutan,—a favorite fruit of the Malayan Archipelago.—It was found that *Dolichos hosei* was easily propagated by cutting off a few rooting branches and establishing them in clay pots. Upland, or Hill, rice gave satisfactory results and should become an important subsidiary crop. Maize of a St. Vincent strain yielded 3206 lbs. air-dried grain per acre. A large plot of the Gambia variety of ground nuts, gave a yield of 2643 lbs. cured nuts per acre.—Plant legislation includes measures to prevent the introduction of the mottling disease of sugarcanes, 'wither-tip' of lime trees caused by *Gloeosporium limeticolum*, and the red-ring disease of coconuts.—Progress of the following industries is reported on: Sugar, bay oil, rice, lime, coconut, bee-keeping, cacao, drugs, and spices. A list of the principal exports for the years 1916-18 inclusive is found on page 16. An account is also given of efforts to increase the quantity and improve the quality of locally-grown foodstuffs as a result of conditions imposed by the war.—J. S. Dash.

16. BRYCE, H. Field experiments, 1920. Grafton experiment farm. Agric. Gaz. New South Wales 32: 168-170. 1921.—In the wheat variety trial the varieties yielded in order as follows: Canberra, Marshall's No. 3, Thew, and Hard Federation.—In the winter-fodder trial Sunrise oats mixed with vetches and mixed with field peas gave the best yields, followed by Guyra oats mixed with legumes.—In winter-fodder manurial trial, superphosphate at rate of 200 lbs. per acre gave largest net-increase return.—L. R. Waldron.

17. BURT, R. C. Flax in the United Provinces. Agric. Jour. India 15: 616-619. 1920.—It is stated that experiments made at the Cawnpore Experimental Farm proved that flax can be successfully grown in the canal-irrigated tracts of the United Provinces. Both English and Japanese seed grew well.—J. J. Skinner.

18. CHEN, CHUNJEN C. [The Pedigreed Seed Co.] Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kan [China Cotton Jour.] 2: 245-250. 2 pl. 1921.—[Text in Chinese.] The organization and management of the Pedigreed Seed Company, of Hartsville, South Carolina, are described. The method used by the company in cotton breeding is related at length with graph.—Chunjen C. Chen.

19. COLLENS, A. E., ET AL. Sugar-cane experiment in the Leeward Islands. Report on experiments conducted in Antigua and St. Kitts-Nevis in the season 1918-19. Imp. Dept. Agric. West Indies Rept. Sugar Exp. Leeward Islands 1918-19: 62 p. 1921.—In the 1st part the author reports on the varieties making the best yields for the period under review and also gives those varieties that made the best yields over periods of from 11 to 18 years. The report covers trials in St. Kitts, Nevis, and Montserrat, and includes results secured from certain new seedlings. Part II gives conclusions drawn from manurial experiments.—J. S. Dash.

20. COX, J. F. The Michigan plan for distributing improved crop varieties. Jour. Amer. Soc. Agron. 13: 82-84. 1921.—The plan includes varietal testing, plant breeding, corn improvement, the provision of large increase fields, and the help of extension specialists and county agents. A crop improvement association and a farm bureau seed department also cooperate.—F. M. Schertz.

21. CROSS, W. E. The distance apart in which cane rows should be planted. Louisiana Planter and Sugar Manufacturer 65: 233-235. 1 fig. 1920.—The 3-year results obtained in Tucuman with cane planted in rows 0.9-2.5 m. apart agree in general with those secured at an earlier period in Louisiana, namely, the closer the rows, the greater the tonnage obtained per acre of sugar cane and sugar. Cane should be planted in rows as close together as will permit mechanical cultivation.—C. W. Edgerton.

22. DAWE, M. T. Columbian Pita fibre.—Part II. Tropic Life 17: 2-4. 1921.—The Pita fiber is of excellent quality and should sell readily for as much as henequen of Yucatan. Certain manufacturers of fiber products have offered to take the entire output of the "pitales" of Chiriguana for 3 years at the current market price of sisal. The chief drawback to the utilization of Pita fiber is the lack of machinery for efficient extraction of the fiber. It is estimated that 40 per cent of the fiber is lost by the present crude methods. A machine for extracting the fiber is being constructed in New York according to plans developed by the author. It is estimated an acre of land will support 5,000 Pita plants; each plant produces 30 leaves per year in 2 cuttings. A conservative estimate places the yield of dry fiber under improved mechanical processes of extraction at 3,030 lbs. per acre.—H. N. Vinall.

23. DOWNING, R. G. Thick or thin seeding for wheat. Agric. Gaz. New South Wales 32: 205. 1921.—Recommendations are made as to proper rate of seeding.—L. R. Waldron.

24. GRIMME, C. Über einige Hülsenfrüchte aus der Levante und aus Kamerun. [Leguminous plants from the Levante and Kamerun.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 37-41. 1920.

25. GUTHRIE, F. B. Analysis of Saltbush. Agric. Gaz. New South Wales 32: 207-210. 1921.—Ash analyses are given of *Atriplex leptocarpum* (?), *A. nummularia*, and *Chenopodium triangulare* as possible sources of potash. In the 2 species of *Atriplex* 40 per cent of the pure ash was composed of K_2O . Notes are given on the value of saltbushes for fodder. Analysis shows them to compare favorably with standard fodders.—L. R. Waldron.

26. GUTHRIE, F. B., G. W. NORRIS, AND J. G. WARD. The influence of atmospheric variations on the weight of bagged wheat. Agric. Gaz. New South Wales 32: 200-202. 1921.—A bag of wheat was weighed daily for 2 years. Weight and absolute and relative humidity are shown graphically. Variations in weight of wheat, of lesser intensity, were found to correspond with variations in humidity. No coefficients are given and the data are not handled statistically.—L. R. Waldron.

27. HARLAND, S. C. Manurial experiments with sea island cotton in St. Vincent in 1918-19, with some notes on the control of certain diseases by spraying. West Indian Bull. 18: 20-33. 1920.—Author draws the following conclusions: (1) Cotton responds markedly to applications of both artificial and organic manures after it has been grown on the same land for a number of years; (2) the size of the crop, leaving pests and diseases out of account, is limited chiefly by the supply of potash in the soil; (3) most cultivated lands of the colony show the rust disease, locally known by the name of "red leaf," which is the characteristic sign of potash exhaustion; (4) phosphate is not to be recommended since the combination of this and potash gave inferior yields to potash alone; (5) cotton-seed meal alone is not to be recommended. The best practice would be to rotate sugar-cane with cotton, using cotton-seed meal and pen manure for the former, and for the latter an artificial fertilizer containing potash; (6) maturity is not affected by manurial treatment; (7) ratio of bolls to flowers is not affected by differences in manurial treatment; (8) in St. Vincent there is great uniformity in the time at which

flowering and bolling begin, reach their maximum, and conclude. The bulk of the 1st crop is picked from the 21st to 24th week from sowing; (9) cotton stainers (*Dysdercus* spp.) being now under control, losses of crop are caused mainly by shedding of buds and bolls, and external-boll and soft-rot diseases. Experiments concerning shedding are not yet concluded. Spraying is useless in the control of external boll disease, but further experiments are needed to determine its effects on the soft-rot disease.—*J. S. Dash.*

28. HEIDUSCHKA, A., UND J. DEININGER. Beiträge zur Chemie der hochausgemahlenden Mehle und der daraus hergestellten Brote. [Chemistry of highly mealed flour and bread.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 161-191. 1920.

29. HENDERSON, G. S. Report of the Imperial Agriculturist. Sci. Rept. Agric. Res. Inst. Pusa 1919-20: 10-30. 3 pl. 1920.—The report includes details of crop rotation as practiced on the Institute farm; a summary of the results of permanent experiments; details of costs of operations with motorized agricultural implements; and breeding of cattle for milk production. The best results in cattle breeding have been obtained from crossing native Indian cows and Ayrshire bulls. One cow produced 7765 pounds of milk during a lactation period of 10 months.—*Winfield Dudgeon.*

30. JACKSON, T. P. Report on the Agricultural Department, Antigua. Imp. Dept. Agric. West Indies Rept. Agric. Dept. Antigua 1918-19: 39 p. 1920.—The author reports: (1) Work in gardens and observations on plants, the latter including notes on *Artabotrys odoratissima*, *Myroxylon Pereiras*, and *Areca catechu*; (2) work in nurseries and distribution of plants, with notes on *Eucalyptus rostrata*, a tree whose wood bids fair to replace foreign woods for railway sleepers; (3) plot experiments at the Botanic and Experiment Stations,—sweet-potato storage and varietal experiments. In the latter experiment, A12 yielded an average of 13,760 lbs. per acre after 3-years' trial; Light Red (yam) yielded an average of 20,373 lbs. per acre. In experiments with Eddoes and Tannias, Tannia Yellow came first with an average yield of 4,280 lbs. per acre after 11 years of experiment; in the fodder experiments, Pearl Millet and Early Amber sugar corn tied for first place with yields of 24,000 lbs. per acre; (4) cotton selection; (5) fungous pests and their control, with a note on *Marasmius sacchari* attacking sugarcane; (6) progress in the sugar, cotton, lime, coconut, onion and corn industries; and (7) miscellaneous notes on silos and ensilage, reforestation, plant legislation, etc.—*J. S. Dash.*

31. JURITZ, CHAS. F. A South Australian vineyard soil. Jour. Dept. Agric. Union of South Africa 2: 137-140. 1921.—The author notes the geological origin of some typical Australian vineyard soils and gives mechanical and chemical analyses of the soil from the Angaston vineyards 40 miles northeast of Adelaide, South Australia.—*A. J. Pieters.*

32. KERLE, W. D. Farmers' experiment plots. Winter fodder variety trials, 1919-20. Upper north coast district. Agric. Gaz. New South Wales 32: 173-180. 5 fig. 1921.—Trials were carried out on 9 farms in this district. Yields were excellent due to favorable seasonal conditions. A trial showed that the lighter wheat seeding with field peas gave the largest forage yield. Generally wheat and peas gave better yields than wheat alone or oats alone. Oats alone yielded better than wheat alone. Yields of green forage in excess of 15 tons per acre were recorded. Phosphatic manures increased yields in all cases.—*L. R. Waldron.*

33. LEAKE, H. MARTIN. The Egyptian cotton problem. A report to the Egyptian government. Agric. Jour. India 15: 485-501, 595-615. 1920, 16: 7-18. 1921.—A discussion of a plan of organization for encouraging the development of the cotton industry, and for disseminating improved and pure seed.—*J. J. Skinner.*

34. LEMMERMAN, OTTO, UND KARL ECKL. Die Rentabilität der Anwendung der künstlichen Düngemittel bei den heutigen Preisen und ihre Bedeutung für die Volksernährung. [The profitableness of using artificial fertilizers at present prices and its meaning for the food supply.] Mittell. Deutsch. Landw. Ges. 36: 177-182. 1921.—A series of tables showing amounts and cost of fertilizers, yields, and values.—*A. J. Pieters.*

35. LÜHRIG. Ueber den Blausäuregehalt des *Phaseolus lunatus*. [On the hydrocyanic acid content of *Phaseolus lunatus*.] Pharm. Zentralhalle 62: 95-97. 1921.—Twenty shipments of Rangoon beans were examined in which the amount of hydrocyanic acid ranged from 2.3 to 37.7 mg. in 100 g. of beans. This quantity of hydrocyanic acid is not detrimental to health, because practically all of it is lost by washing the beans, boiling in water and discarding the water.—H. Engelhardt.

36. MAIDEN, J. H. Spread of another bad weed. Agric. Gaz. New South Wales 32: 202. 1921.—Note is given on *Gilia squarrosa*, California stinkweed.—L. R. Waldron.

37. MATENAERS, F. F. O. P. V. Silage. Mitteil. Deutsch. Landw. Ges. 36: 184. 1921.—A note on oat-pea-vetch silage said to be very satisfactory in Nova Scotia. An average of 12 tons per acre green matter may be secured, and this has a higher dry weight than maize.—A. J. Pieters.

38. MATENAERS, F. F. Praktische Erfahrungen mit der Sonnenblumensilage. [Practical experience with sunflower silage.] Mitteil. Deutsch. Landw. Ges. 36: 154. 1921.—A brief account of success with this silage in Iowa is copied from the St. Paul, Minnesota, "Deutscher Farmer." The sunflowers yielded 20 tons per acre against 10 tons of maize on similar land. In spite of some decay due to imperfect ensiling, cattle ate the silage as eagerly as the maize silage; there was no apparent difference in the flow of milk.—A. J. Pieters.

39. MOFFET, S. Conseils pratiques pour améliorer la culture de la pomme de terre. [Practical advice to improve the cultivation of potatoes.] Bull. Sci. Pharm. 27: 638-642. 1920.—Diseases of the potato are discussed and advice is given in regard to the selection of the tubers for propagation.—H. Engelhardt.

40. MOORE, J. C. Report on the Agricultural Department, Grenada. Imp. Dept. Agric. West Indies Rept. Agric. Dept. Grenada 1918-19: 38 p. 1920.—Work of botanical interest falls under 4 heads: (1) Work in gardens and observations on plants, including 'a note on a guava (Indian White) yielding a fruit weighing 10 oz. and having a circumference of 10 in.; (2) plot and other experiments, with remarks on yam culture, corn storage, edible beans, and Sunn Hemp (*Crotalaria juncea*); (3) progress of industries, giving export figures, etc., of cacao, spices, cotton, and limes; (4) plant legislation.—J. S. Dash.

41. MOORE, J. C. Report on the Agricultural Department, Grenada. April-December 1919. Imp. Dept. Agric. West Indies Rept. Agric. Dept. Grenada 1919: 21 p. 1921.—Plot experiments with Sunn Hemp (*Crotalaria juncea*) and with yam varieties (*Momordica cochinchinensis*) are recorded. The latter grew better from unshelled than from shelled seed. Onions can be successfully and profitably grown under Grenada conditions; experiments gave a yield of 3.38 tons of dried onions per acre. Full account is given of the status of the cacao, spice, sugar, cotton, coconut, and lime industries.—J. S. Dash.

42. NEIDIG, RAY E., ROBERT S. SNYDER, AND C. W. HICKMAN. Sunflower silage digestion experiment with cattle and sheep. Jour. Agric. Res. 20: 881-888. 1921.—Feeding experiments and analyses of sunflower (*Helianthus*) silage indicate that it compares very favorably with maize silage. Where both maize and sunflowers can be grown, the selection of a silage crop depends upon comparative tonnage per acre and cost of production.—D. Reddick.

43. PINNOW, J. Über den sauren Charakter des Mehles. [The acid character of flour.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 243-246. 1920.

44. PITT, J. M. Farmers' experiment plots. Maize experiments, 1919-20. Central coast district. Agric. Gaz. New South Wales 32: 25-27. 1921.—Maize trials were conducted in cooperation with a number of farmers. With a favorable season, high yields were secured. Improved Yellow Dent, Yellow Horsetooth, Golden Nugget, Leaming, and Manning White

were the best yielders.—In green-manuring trials, corn grown on land following field peas outyielded check plot, and this in turn outyielded maize following barley and vetches. Low yield of the corn was accounted for by the very heavy crop of barley and vetches.—*L. R. Waldron.*

45. PRIDHAM, J. T. Trials of imported cereals. *Agric. Gaz. New South Wales* 32: 171-172. 1921.—Notes are given on varieties of oats, wheat, and barley imported from U. S. A. and Canada. Of 4 oat varieties, O. A. C. 72, Sixty Day, Banner, and Fulghum, only the Fulghum was of promise. Of the wheat varieties Red Fife, Glyndon Fife, Red Rock, Kanred, Kharkov, Fultz, Marquis, Burbank, Super, Yeoman, and Fenman, none was found to be of promise and all were distinctly inferior to Hard Federation. Barley O. A. C. 21 is evidently worthy of further trial.—*L. R. Waldron.*

46. REYNOLDS, MARK H., W. R. BIRKS, AND H. BARTLETT. Farmers experiment plots. Wheat, oat and barley experiments, 1920. *Agric. Gaz. New South Wales* 32: 153-167. 1 fig. 1921.—In the northwestern district wheat experiments were carried out cooperatively on 15 farms; 15 varieties were involved, averaging about 7 varieties to the farm. Hard Federation and Canberra yielded well; Federation was most commonly attacked by stem rust. Experiments with barley and oats were only partially successful.—In the central western district trials were conducted on 9 farms, 12 varieties being used. Previous fallowing did not affect smut and take-all. Canberra, Hard Federation, and Yandilla King yielded well. Where a comparison was possible wheat for hay was outyielded by oats. The new oats variety, Sunrise, outyielded Algerian by 10 bushels. Results of manurial experiments were inconclusive. In 2 cases out of 3 light wheat seeding gave best yields.—In the western district, trials were conducted on 13 farms, 14 varieties of wheat being used. Canberra, Federation, and Hard Federation yielded best. Guyra oats outyielded Sunrise in 2 cases out of 3. Manurial trials with superphosphate gave increased yields. Oats for hay gave yields equal to or better than those secured from wheat. Large yields of western district are ascribed to favorable weather conditions plus available plant food accumulated during the 2 dry years, 1918 and 1919.—*L. R. Waldron.*

47. ROBSON, W. Report on the Agricultural Department, Montserrat. *Imp. Dept. Agric. West Indies Rept. Agric. Dept. Montserrat* 1918-19: 52 p. 1920.—The following topics are reported on: (1) Work in the gardens and observations on plants, with notes on *Caryocar nucifera*, *Tecoma spectabilis*, *Corypha umbraculifera*, *Pithecolobium Unguis-cati* (generally the most satisfactory of West Indian hedgeplants, but unfortunately a host of *Cuscuta* sp.), and *Triphasia aurantiola*, which makes a very attractive and shapely hedge. (2) Recent plant importations, including notes on *Canavalia gladiata*, which has proved satisfactory as a green-manure cover crop and for planting between young lime trees, and *Saccharum ciliare* (yielding 20 tons of green matter per acre), which may be grown on waste lands and applied as a mulch for young lime trees. (3) Cotton experiments, including extensive notes on cotton breeding work and cotton manurial experiments. (4) Observations on the lime industry. Under this head are discussed the following principal environmental factors connected with the successful development of lime trees: The amount and distribution of the rainfall,—with which is associated the humidity of the atmosphere,—amount of exposure to prevailing winds, damage from scale insects, damage from root grubs, soil medium in which trees are grown, and the manurial requirements of the trees. (5) Sugarcane variety experiments. (6) Experiments with bay trees (*Pimenta acris*), giving quantities of leaves, results of distillations, etc. (7) Minor crops, including peas, beans, yams,—the latter when grown on stakes yielded 79 per cent more than when grown without stakes,—ground nuts, sweet potatoes,—the variety Red Bourbon yielding after 18 experiments an average of 13,034 lbs. per acre,—onions, papaws, *Datura metel* as a source of Scopolamine, and green manure crops. (8) Diseases, particularly a downy mildew of young lime seedlings which is easily controlled by applying Bordeaux mixture to the plants in the beds. (9) Export figures, etc., on the cotton, lime, sugar, papain, bay oil, and onion industries. (10) Plant legislation.—*J. S. Dash.*

48. SANDS, W. N., ET AL. Report on the Agricultural Department St. Vincent. Imp. Dept. Agric. West Indies Rept. Agric. Dept. St. Vincent 1918-19: 39 p. 1920.—An account is given of manurial experiments with cotton (see Bot. Absts. 9, Entry 27) and with arrowroot. In the latter an average gain of no less than 241 per cent over non-manured plots was attained by mulching with *Gliricidia* prunings. This procedure gives better results than the use of chemical manures.—Certain hybrids of castor oil plant between a type known as *Ricinus Gibsoni* and a St. Vincent native, have given promising plants in F_2 , and a very prolific type was selected for culture in F_3 . Sown on April 25 on ridges 4 feet apart with 1 foot between the plants, this type flowered in 33 days from sowing. The whole was picked on November 16, at which time the plot had yielded at the rate of 1000 lbs., or nearly 22 bushels per acre.—Recently amended plant legislation provides for the proper inspection and, if necessary, disinfection or destruction of imported plants.—Figures and other details are furnished of the cotton, starch, cacao, sugar, maize, coconut, ground nut, and pea industries.—J. S. Dash.

49. SAYER, WYNNE. Report of the Secretary, Sugar Bureau. Sci. Rept. Agric. Res. Inst. Pusa 1919-20: 116-119. 1920.—An appendix to the Scientific Reports recounting the steps that led to the formation of a Sugar Bureau by the Government of India, and reporting progress in the collection of information about the sugar industry in India.—Winfield Dudgeon.

50. SHEPHERD, A. N., R. N. MAKIN, AND J. M. PITT. Farmer's experiment plots. Winter fodder variety trials, 1920. Murrumbidgees irrigation areas. Agric. Gaz. New South Wales 32: 77-85. 1921.—Trials were conducted in various districts with barley, wheat, and oats, alone and with vetches and peas. The addition of the legumes ordinarily increased the yields, and the oats seedings generally gave the highest yields.—L. R. Waldron.

51. SHEPHERD, F. R., AND W. I. HOWELL. Report on the Agricultural Department, St. Kitts-Nevis. Imp. Dept. Agric. West Indies Rept. Agric. Dept. St. Kitts-Nevis 1918-19: 35 p. 1920.—Small plot experiments with economic crops, including corn, peanuts, cassava, hill rice, peas, sweet potatoes, yams, and onions, are recorded; also manurial experiments with cotton. For cotton, tables, and curves of flowering, shedding, and bolting are given.—Plant legislation in force in the Presidency is noted; it includes an ordinance prohibiting the exportation of nursery stock or plants to the U. S. A. without certificate from a recognized authority.—The sugar exports show a considerable decrease for the year, owing to drought, while the area in cotton, on account of prevailing high prices, has been remarkably increased. Results with truck crops in Nevis were not, on the whole, as satisfying as those obtained in St. Kitts.—J. S. Dash.

52. STADLER, L. J., AND C. A. HELM. Corn in Missouri, I. Corn varieties and their improvement. Missouri Agric. Exp. Sta. Bull. 181. 51 p. 1921.—Variety tests of corn on 9 experiment fields and several hundred cooperative variety tests on farms in Missouri, are briefly reported. The practical value of various methods of corn improvement is discussed.—L. J. Stadler.

53. STENING, H. C. Gallipoli wheat under local conditions. Agric. Gaz. New South Wales 32: 184. 1921.—Yields are reported on this new wheat variety at Temora Experiment Farm. It ranked 4th when grown with 12 other varieties. It resists lodging and shelling.—L. R. Waldron.

54. STEVENSON, L. Meadows and pastures. Agric. Jour. [British Columbia] 6: 40, 45. 1921.—Summary of an address to British Columbia Dairymen's Convention.—J. W. Eastham.

55. THATCHER, L. E. Annual white sweet clover. Monthly Bull. Ohio Agric. Exp. Sta. 6: 31-32. 1 fig. 1921.—A report on the tests of this legume as made at the Ohio station. It requires from 153 to 183 days to mature seed in Ohio and about 80 days intervene between seeding and blooming period. Earlier seeding varieties must be developed for Ohio conditions. The relative importance of this legume is as yet problematical.—R. C. Thomas.

56. THORNE, C. E. Thirty-eighth annual report of the Ohio Agricultural Experiment Station. Ohio. Agric. Exp. Sta. Bull. 338. 7-31. 1919.—In this report the director gives the work and publications of the various departments of the Station for the year 1918-19.—R. C. Thomas.
57. THORNE, C. E., AND CARY W. MONTGOMERY. County experiment farms in Ohio. Ohio Agric. Exp. Sta. Bull. 344. 223-478. 1920.—An account is presented of the rotation and fertilizer experiments carried on at 9 sub-stations. The work reported includes: Drainage experiments at the Clermont County farm; variety tests of corn, oats, soybeans, and wheat at the Hamilton County farm; variety tests of silage corn at the Trumbull County farm; and at the Washington County farm special attention was paid to vegetable gardening, especially to utility work with cabbage, tomatoes, and sweet corn. The crops used in the various rotations were corn, oats, wheat, clover, soy beans, tobacco, potatoes, sugar beets, alfalfa.—R. C. Thomas.
58. TICE, C. The potato in British Columbia. British Columbia Dept. Agric. Bull. 86. 75 p., 78 fig. 1921. An information bulletin for growers. It contains a chapter on diseases.—J. W. Eastham.
59. TSCHERMAK, ERICH. Massnahmen zur Gewinnung grösserer Mengen von Mutterkorn. [Measures for securing larger amounts of Ergot.] Mitteil. Deutsch. Landw. Ges. 36: 184-185. 1921.—Owing to the high prices paid by dealers in drugs it has become profitable to save the ergot. The author points out that any condition tending to decrease or delay fertilization of the rye, increases the chances for the production of ergot, and he makes some practical suggestions to that end.—A. J. Pieters.
60. VENKATRAMAN, T. S., AND R. THOMAS. The care and treatment of new sugarcane importations. Agric. Jour. India 16: 24-31. Pl. 2-4. 1921.—The packing of cane pieces for shipment is described and the methods of preliminary germination and necessary precautions against ants are discussed.—J. J. Skinner.
61. WIMMER, G. Über den jetzigen Stand unserer Kenntnisse und Erfahrungen in der Tabakdüngung. [Concerning the present state of our knowledge and experience in tobacco fertilizing.] Mitteil. Deutsch. Landw. Ges. 36: 166-167. 1921.—A general statement of current information.—A. J. Pieters.
62. ZADE. Das Knaulgras. [Orchard grass.] Arbeit. Deutsch. Landw. Ges. 305. 69 p. 1920.—Two species of *Dactylis* are recognized as occurring in middle Europe, *D. glomerata* L. and *D. Aschersoniana* Graebner; the author concerns himself with the former. Twelve varieties have been described but culture tests have shown that they are not constant. The botanical characters and morphology of the species are described, especially the inflorescence, of which several types are illustrated. Much space is devoted to a discussion of germination. Hand-gathered orchard-grass seed respond to a sudden and sharp fluctuation in temperature. This is not so much the case with seed that have been thrashed or sweated. In field practice not more than 20 per cent of the viable seed can be counted on to produce plants. Culture, feeding value, climatic adaptation, and fertilizers are discussed briefly. Seed production is treated at some length. It is said that for conditions in Germany the home-grown seed is best. In the chapter on breeding attention is called to the difficulty of obtaining a pure line, because no seed can be secured from single select plants by self-pollination. The author's method is, therefore, to start the breeding work with 2 selected plants as nearly alike morphologically and physiologically as possible.—A. J. Pieters.

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

NEIL E. STEVENS, *Editor*

(See also in this issue Entries 273, 456, 574)

63. ANONYMOUS. B. E. Fernow. *Forstwiss. Centralbl.* 42: 375-380. 1920.—Résumé of an article by FILIBERT ROTH in *Amer. Forestry* (see Bot. Absts. 6, Entry 958) outlining the part played by Fernow in the forestry movement of America.—*W. N. Sparhawk.*

64. ANONYMOUS. Die Wittmack-feier der D. G. G. am Donnerstag, den 25. September 1919. [The Wittmack festival of the German horticultural society, Thursday, Sept. 25, 1919.] *Gartenflora* 68: 245-254. *Portrait.* 1919.—Speeches and observances in honor of the 80th anniversary of Ludwig Wittmack (born Sept. 26, 1839), with his response, giving a few items of personal history.—*M. F. Warner.*

65. ANONYMOUS. [John Reader Jackson, 1837-1920.] *Nature* 106: 511. 1920.—Jackson published botanical articles in various journals, as well as *Commercial Botany of the Nineteenth Century* (1890); he also edited Barton and Castle's *British Flora Medica* (1877).—*O. A. Stevens.*

66. ANONYMOUS. Prix et subventions attribués en 1920. Académie des Sciences, Paris. [Prizes and grants awarded in 1920 by the Paris Academy of Science.] *Compt. Rend. Acad. Sci. Paris* 171: 1262-1343. 1920.—A list of the awards is given and in connection with each a brief review of the scientific achievements of the recipient. The following are the botanists and the prizes which they received: August Chevalier, Fondation Tchihatchef; H. Herissey, Prix Jecker (shared with Gault); Albert Maublanc, Prix Desmazières; Lucien Hauman-Merck, Prix de Coincy; Pierre See, honorable mention; Paul Bertrand, Prix Saintour.—*C. H. Farr.*

67. ANONYMOUS. The organization of the Indian Botanical Society. *Jour. Indian Bot.* 19¹⁰: [2 p.] 1920 [1921].—At the Nagpur meeting of the Indian Science Congress, January 1920, the Botany section decided to organize an Indian Botanical Society, with the encouragement of research as its primary aim. On December 14, 1920, the membership numbered 71. The officers are: Winfield Dudgeon, President; W. Burns, Vice-President; Shiv Ram Kashyap, Secretary-Treasurer; and Birbal Sahni and K. Rangachari, Councillors.—*Winfield Dudgeon.*

68. ANONYMOUS. Sir D. E. Hutchins. *Nature* 106: 540-541. 1920.—Hutchins died in New Zealand at the age of 70. His forestry work in India, South Africa, and Australia is noted.—*O. A. Stevens.*

69. ABBAY, RICHARD. Our orchards; letters to the East Anglian Daily Times, 1892-1920, with notes. 35 p. W. H. Harrison: Ipswich [1920].—Hargrove's History of Knaresborough (1789) says the original Ribston Pippin was raised from an apple brought from France, and that trees propagated from it were then to be found in nearly every orchard in the county. It was in 1709 that Sir Henry Goodricke, then owner of Ribston Hall, was traveling in Normandy, and took home the pips of a fine apple, from one of which came the original tree. This was blown down about a hundred years ago, but a shoot from the old stump was still living, and bearing a few apples each year, as late as 1909. The Blenheim Orange originated as a seedling in the garden of a cottager named Kempster at Woodstock, about 1792, and for many years his name was locally associated with the apple.—*M. F. Warner.*

70. BERINGER, G. M. The centenary of pharmaceutical education in America. *Amer. Jour. Pharm.* 93: 75-104. *Illus.* 1921.—A review of the progress of pharmaceutical education in America during the past hundred years. The organization and progress of the Philadelphia College of Pharmacy, founded on February 23, 1821, as the Philadelphia College of Apothecaries, is described, and accounts are given of a number of personages who aided in its development. The article is illustrated with portraits of some of these persons, together with photographs of different buildings occupied by the college.—*Anton Hogstad Jr.*

71. BRITTEN, JAMES. Henry William Lett (1838-1920). Jour. Botany 59: 75-76. 1921.—An account of the Irish botanist Canon Henry William Lett, born at Hillsborough in 1838, educated at Trinity College, Dublin, ordained in 1871, and after occupying various posts, rector of Aghaderg 34 years. His botanical work was mainly with mosses and hepatics. A list of his more important papers is given.—K. M. Wiegand.

72. BRITTEN, JAMES. Thomas Walter (1740?-88) and his grass. Jour. Botany 59: 69-74. 1921.—A summary of materials regarding Walter's life and herbarium. His *Flora Caroliniana* (1788) was published by the elder John Fraser, who gives the fullest account of Walter's botanical work in his *Short History of Agrostis Cornucopiae* (1789). This was the *Cornucopiae perennans* of Walter (now called *Agrostis perennans*), which he and Fraser attempted to exploit in Europe as a valuable agricultural grass.—K. M. Wiegand.

73. [BRITTEN, JAMES.] William Whitwell. Jour. Botany 59: 84-85. 1921.—A brief account of the life and writings of Whitwell (1839-1920), who though not a critical botanist, was a careful observer and collector. His herbarium has been given to the Birmingham Museum.—K. M. Wiegand.

74. CARRIER, LYMAN. Dr. John Mitchell, naturalist, cartographer, and historian. Ann. Rept. Amer. Hist. Assoc. 1918: 199-219. 1921.—John Mitchell (died 1768) came to Virginia about 1700 and returned to England early in 1746. He wrote *Dissertatio brevis de Principiis Botanicoe et Zoologorum* (1738) and *Nova Plantarum Genera Virginienisium* (1741), which were published in *Acta Academiae Naturae Curiosorum* (1748). He corresponded with Linnaeus, Collinson, Bartram (whom he visited in Pennsylvania), and other naturalists of his day. He wrote several other scientific papers, but his principal works were on American affairs. He made the best map of North America of colonial times, which was used by the peace council at the close of the Revolution. With it was published anonymously *The Contest in America between Great Britain and France* (1757), which, with *The Present State of Great Britain and North America* (1767), also issued anonymously, is definitely attributed to Mitchell in *American Husbandry* (London, 1775). Carrier proceeds to show that John Mitchell must also have been the author of *An Account of the English Discoveries and Settlements in America*, in the revised edition of Harris' *Collection of Voyages and Travels*, vol. 2, 1748; also of *A New and Complete History of the British Empire in America* (1756), and, finally, of *American Husbandry*, "By an American," which was published after Mitchell's death in 1775.—M. F. Warner.

75. CHRIST, HERMANN. Der Briefwechsel der Basler Botaniker des 18. Jahrhunderts Achilles Mieg, Werner de La Chenal und Jacob Christoph Ramspeck mit Albrecht von Haller. [Correspondence of the 18th century Basel botanists Mieg, La Chenal, and Ramspeck with Haller.] Verhandl. Naturf. Ges. Basel 21: 1-59. 1918.—A collection of 59 letters from Haller to Mieg, covering the period Nov., 1755, to Dec. 3, 1777, is in the library of the University of Basel, while 27 of Mieg's own letters to Haller were published by the latter in his *Epistolae ab Viris eruditiss* (Bern, 1773-75), vol. 4-6. The letters from Haller to La Chenal have been preserved in the Schonauer family, while those of La Chenal to Haller, covering the period 1759-1772, are included in the *Epistolae* vol. 3-6. These two groups of correspondence are rich in botanical interest, and have been abstracted with great thoroughness, with addition of explanatory notes in regard to the plants and authorities mentioned. By way of introduction brief outlines are given of the life and principal publications of Mieg (1731-1769), La Chenal (1736-1800), and Ramspeck (born 1722). The latter was a pupil of Haller at Göttingen, but his letters between 1748 and 1756, included in the *Epistolae* vol. 1-4, offer only a few items of botanical importance.—M. F. Warner.

76. CHRIST, HERMANN. Zur Geschichte des alten Gartens. V. [Contributions to the history of old-time gardens.] Basler Zeitschr. Gesch. u. Altertums. 17: 370-385. 1918.—Continuing a series of papers in vol. 14-16 of the same journal (1915-17), the author discusses the origin and introduction in Switzerland of certain garden plants. He takes up *Rosa centifolia* and

several bulbs and ornamentals as noted by Clusius; North American plants introduced into Europe in the 17th century as noted by Barrelier; *Vicia faba* in Switzerland and South Germany; notes on cultivated plants and their vernacular names from Zermatt; with other items supplementary to his previous papers.—*M. F. Warner.*

77. GEE, WILSON. South Carolina botanists: biography and bibliography. Bull. Univ. South Carolina 72. 52 p., portraits. 1918.—John Lawson (died 1712), Mark Catesby (about 1679–1749), Alexander Garden (about 1728–1791), William Bartram (1739–1823), Thomas Walter (about 1728–about 1788), John Drayton (1766–1822), John L. E. W. Shecut (1770–1836), James Macbride (1784–1817), Stephen Elliott (1771–1830), Henry W. Ravenel (1814–1887), Lewis R. Gibbes (1810–1894), Francis Peyre Porcher (born 1825), Joseph Hinson Mellichamp (1829–1903).—*Neil E. Stevens.*

78. HAY, T. A rare work on alpine. Gard. Chron. III, 68: 285. 1920.—Practical Hints on the Culture and General Management of Alpine or Rock Plants, by James Lothian (Edinburgh, W. H. Lizars, 1845), is probably the first book on this subject published in Great Britain, and contains an extensive and interesting catalogue of 17 pages of plants suitable for rock gardens.—*M. F. Warner.*

79. H[EWITT], J. William Tyson. South African Jour. Nat. Hist. 2: 288–290. Portrait. 1920.—Tyson died at Grahamstown, April 14, 1920, in his 71st year. He collected the flora of South Africa for nearly 45 years, his material from East Griqualand, Pondoland, and Murraysburg being specially important. The most complete set of his plants is in the Cape Government herbarium. *Tysonia*, a genus of Boraginaceae, was dedicated to him by Dr. Bolus.—*M. F. Warner.*

80. JOHNSON, D. S. The Cinchona Station. Bot. Gaz. 69: 347–348. 1920.—This Jamaican Station will be available for American botanists this year. Located at 5000-foot elevation on the southern slope of the Blue Mountains, its dry, sunny slope offers epiphytic and xerophytic varieties, while the moist northern slope produces liverworts, mosses, and ferns.—Botanists studying lowland plants have use of Hope Gardens and the seacoast produces vegetation of ecological interest.—*E. A. Fenner.*

81. LINNÉ, CARL VON. Caroli Linnaei Adonis stenbrohultensis, utgiven af Felix Bryk. 12 mo, 13+[28] p. Björck & Börjesson: Stockholm, 1920.—See Bot. Absts. 6, Entry 1464.

82. McCUBBIN, W. A. Abstracts of Canadian plant disease literature. Ann. Rept., Quebec Soc. Protection of Plants 11: 72–83. 1919.—A list, in alphabetical order by authors, of 220 articles on plant diseases published in Canadian bulletins or periodicals up to the end of 1918. A short explanatory note of the contents is given with each entry.—*J. H. Faull.*

83. MARQUART, U. Jagdliche und forstliche Zustände in Württemberg im 18. Jahrhundert. [Forest conditions in Württemberg in the 18th century.] Allg. Forst- u. Jagdzeitg. 95: 263–266. 1919.—A brief sketch of the development of game propagation and forestry in Württemberg during the 18th century.—*Joseph S. Illick.*

84. PAYNE, C. H. Old French gardening books. Gard. Chron. III, 63: 215–216. 1918.—Many English books, usually known only under the name of their translators, are actually of French origin; among others the following are identified: The Grete Herball with Le Grant Herbier en Francoys (1520?); Maseall, A Booke of the Arte and Maner how to Plant and Graffe all Sortes of Trees with Brossard, L'Art et Manière de Semer Pépins et de Faire Pépinières (1552); Surdet's Maison Rustique (1600) with that of Estienne; Evelyn's The French Gardiner with Le Jardinier Francois by Nicolas de Bonnefons; The Art of Pruning Fruit Trees (1685) with L'Art de Tailler les Arbres Fruitières (1678) by Nicolas Venette; The Theory and Practice of Gardening (1712) by John James, with Dezallier d'Argenville, La

Theorie et la Pratique du Jardinage (1709); Fleetwood's Curiosities of Nature and Art in Husbandry and Gardening (1707) with the Curiositez de la Nature et de l'Art sur la Végétation of the Abbe Vallemont (1705).—*M. F. Warner.*

85. RUSSELL, E. J. [Prof. Italo Giglioli.] *Nature* 106: 573. 1920.—Obituary of this noted teacher and investigator in agriculture who died Oct. 1, 1920.—*O. A. Stevens.*

86. SAVELLI, MARTINO. *La vendita dell'erbario di Giuseppe Raddi.* [The sale of Raddi's herbarium. *Bull. Soc. Bot. Ital.* 1918: 3-8. 1918.—Scope and condition of the herbarium were carefully investigated by Gaetano Baroni, head gardener of the Botanical Garden at Florence, and its purchase for the University of Pisa was urgently recommended by Savi. It comprised rare plants from Brazil and Madeira, with others from Australia, Cape of Good Hope, and the East Indies, which had been obtained by exchange from Brown, Sieber, Mayen, and other correspondents. It was also rich in groups and genera on which Raddi had specialized, such as grasses and cryptogams, *Melastoma* and *Piper*. It reached Pisa about March, 1830, and was incorporated by Savi with the University herbarium. About the same time, also, Raddi's Egyptian collections were received, the botanical portion being turned over to Savi for the herbarium; while the zoological portion was divided between the museums of Pisa and Florence.—*M. F. Warner.*

87. SENN, GUSTAVE. Prof. Dr. Hermann Vöchting. *Verhandl. Naturf. Ges. Basel* 30: 1-9. *Portrait.* 1919.—Vöchting was born at Bromberg, Feb. 8, 1847, and trained as a gardener. Going as a young man to the botanical garden at Berlin he came under the influence of Professor Alexander Braun, which led him to study botany under Braun, Pringsheim, and Kny; he took his degree at Göttingen in 1873. The following year he became lecturer at Bonn, where he zealously carried on his investigation of morphological problems by the experimental method. As a result of the publication of his researches in Pflüger's *Archiv* in 1877, he was called to the chair of botany at Basel in 1878, succeeding his friend Pfeffer, who had been called to Tübingen. In 1887 he was again called to succeed Pfeffer at the University of Tübingen, where he remained until his death, Nov. 24, 1917. His botanical work is summarized, and a list of 34 publications by him is appended.—*M. F. Warner.*

88. SPRAGUE, T. A., AND JAMES BRITTEN. The botany of the "Herald." (Bibliographical note. *LXXXIII*). *Jour. Botany* 59: 22-24. 1921.—The date of issue and limits of each of the 10 parts (1852-1857) has been worked out by Sprague for The Botany of the Voyage of H. M. S. 'Herald,' by Berthold Seeman. Britten has appended a list of the various botanists who assisted in the work, with their respective contributions.—*K. M. Wiegand.*

89. VINES, S. H., AND DRUCE, G. C. *An account of the herbarium of the University of Oxford, Part II.* p. 21-55. Clarendon Press: Oxford, 1919.—Beside the additions to the herbarium, there is a list of collectors represented, often with dates of birth and death or other biographical information.—*Neil E. Stevens.*

90. WATERS, C. E. More about early days of the American Fern Society. *Amer. Fern Jour.* 11: 16-19. 1921.

91. WATTS, FRANCIS. Tropical department of agriculture with special reference to the West Indies. *West Indian Bull.* 18: 101-133. 1920.—This paper, reproduced from the *Journal of the Royal Society of Arts* for Feb. 20 and 27, 1920, deals with the Imperial Department of Agriculture for the West Indies, and notably the evolution of the various agricultural institutions from the smaller botanical gardens, and the part the larger institutions have played in the economic development of the colonies. Through the scientific study and development of already existing industries, such as sugar, and the fostering of others, such as cotton, a condition of depression has gradually given place to prosperity. Methods of study and control of the pests and diseases attacking staple crops and the difficulties encountered are also fully dealt with.—*J. S. Dash.*

92. WILSON, JAMES. Improved varieties and larger crops. Jour. Dept. Agric. Ireland 21: 18-25. 1921.—Account of European conditions from 1653 to the present.—*Donald Folsom*.

93. W[RIGHT], C. H. Drawings of Indian plants. Roy. Bot. Gard. Kew. Bull. Misc. Inform. 1919: 207-208. 1919.—Kew has a set of about 600 drawings, most of which appear to have belonged to Claude Martin (1731-1800), officer of the East India Company and later major-general in the Bengal Army. Most of the plants are named by William Roxburgh, who received material for his *Flora Indica* from Martin, who lived at Lucknow 1776-1800. With this collection are other drawings of plants from the Caucasus or Northern Persia, probably made for Sir Gore Ouseley when ambassador to Persia 1810-1814.—*M. F. Warner*.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ALFRED GUNDERSEN, *Assistant Editor*

(See also in this issue Entries 70, 91, 132, 135, 157, 299, 335, 336, 350, 574)

94. ANONYMOUS. [Rev. of: BABCOCK, E. B., and J. L. COLLINS. *Genetics laboratory manual*. xi + 56 p. McGraw-Hill Book Co.: New York; Hill Publishing Co., Ltd.: London, 1918.] *Sci. Prog.* [London] 14: 171. 1919.

95. ANONYMOUS. [Rev. of: BOWER, F. O. *Botany of the living plant*. x + 580 p., fig. 147. Macmillan & Co.: London, 1919.] *Sci. Prog.* [London] 14: 348-349. 1919.

96. ANONYMOUS. [Rev. of: GAGER, C. S. *A laboratory guide for general botany*. 2nd ed., x + 206 p. P. Blakiston's Son & Co.: Philadelphia, 1919.] *Sci. Prog.* [London] 14: 349. 1919.

97. ANONYMOUS. [Rev. of: NEVILLE, H. A. D., and L. F. NEWMAN. *A course of practical chemistry for agricultural students*. Vol. II, Part I. 122p. Cambridge University Press: 1919.] *Sci. Prog.* [London] 15: 142. 1920.

98. B., R. A. [Rev. of: FRITCH, F. E., and E. J. SALISBURY. *An introduction to the structure and reproduction of plants*. Svo, viii + 458 p., 2 pl., 225 fig. Bell & Sons: London, 1920.] *Jour. Botany* 59: 82-83. 1921.

99. BARBEY, A. *Le Parc National Suisse*. [The Swiss National Park.] *Rev. Eaux et Forêts* 58: 353-356. 1920.—The Swiss National Park, comprising 14,000 hectares in the Engadine, was created through the efforts of the Swiss League for the Protection of Nature. Its purpose is not to serve as a mecca for tourists, but as a vast, open-air, scientific laboratory removed from the influence of man and devoted to the free development of vegetable and animal life. Hunting, grazing, and lumbering are prohibited. A Commission of Scientific Study has been established to observe and record all manifestations of nature in the park and, with the aid of a corps of Swiss naturalists, to publish monographs on its geology, fauna, flora, climatology, etc.—*S. T. Dana*.

100. BEAUMONT, A. B. *The introductory course in soils*. *Jour. Amer. Soc. Agron.* 13: 79-81. 1921.—The paper is chiefly a discussion of the laboratory work of a course in soils.—*F. M. Schertz*.

101. BORGMANN, W. *Ausbau des forstlichen Hochschulunterrichts an der Universität Giessen*. [Expansion of the forestry course at the University of Giessen.] *Deutsch. Forstzeitg.* 36: 17-18. 1921.—Sometime before the war it was proposed to combine the forest schools at Giessen, Tübingen, and Karlsruhe. The question arose again after the war, and the course at Tübingen was transferred to Freiburg (Baden), but the Hessian government decided to

keep the school at Giessen and to enlarge it considerably by establishing new chairs of applied biology, including forest botany, zoology, and soil science. The school will not confine its work to forestry alone, but will cover such subjects as plants and animals injurious to fields, orchards, and vineyards.—*W. N. Sparhawk.*

102. CALDWELL, OTIS W., W. L. EIKENBERRY, AND EARL R. GLENN. *Elements of general science. Laboratory problems.* 188 p. Ginn & Co.: Boston, 1920.—Directions for 68 experiments, about one-fourth relating to plants, with questions and references.—*A. Gundersen.*

103. CALDWELL, OTIS W. Contribution of biological sciences to universal secondary education. *School Sci. and Math.* 21: 103-115. 1921.

104. CALL, L. E. Prerequisites for agronomy subjects. *Jour. Amer. Soc. Agron.* 13: 49-53. 1921.—General botany and chemistry are regarded as prerequisites.—*F. M. Schertz.*

105. DRAGENDORFF, G. *Plant analysis: Qualitative and quantitative. English translation from the German by Henry G. Greenish, xvi + 280 p., 11 fig.* G. E. Stechert & Co.: New York, 1921.—This is an anastatic reprint of the English edition of 1883. The work concerns the methods and results of the chemical examination of plant tissues and plant products. Part one comprises 8 chapters on examination of moisture and ash, ethereal and fixed oils, wax, chlorophyll, resins, tannins, alkaloids, glucosides, mucilage, saponin, acids, sugars, amides, inulin, proteins, starch, lignin, cellulose, and many other substances. Tables showing (1) the percentage composition of the constituents of plants mentioned in the book, and (2) the composition of the more important components of plants arranged according to percentage of carbon are given.—*C. S. Gager.*

106. DUNN, S. T. [Rev. of: BOSE, G. C. *A manual of Indian botany.* 8vo, xvi + 368 p., 8 pl. Blackie & Son: Bombay, London, and Glasgow.] *Jour. Botany* 59: 83-84. 1921.

107. MILLER, M. F. The teaching of soils. *Jour. Amer. Soc. Agron.* 13: 71-78. 1921.—The paper sets forth the point of view of the members of the meeting of soil instructors held at Lexington, Kentucky. The college course in soils should carry 5 semester-hours credit and should be called "The Principles of Soil Management." Three lectures, 1 quiz and 1 laboratory period per week should be required. This course should be given in the sophomore year and the prerequisites should include inorganic chemistry, geology, and physics.—*F. M. Schertz.*

108. SCHMITT, CORNEL. *Botanische Schüler-Übungen nebst Resultaten.* [Botanical exercises for schools, with results.] 4th ed., 42 p. F. P. Datterer & Co.: Freising, Germany, 1920.—Two hundred exercises with plants beginning with germination and growth.—*A. Gundersen.*

109. SHIPLEY, A. E., ET AL. Report of the Tropical Agricultural College Committee. *West Indian Bull.* 18: 1-12. 1920.—This report, made by a committee of prominent scientists appointed by the Secretary of State for the Colonies, England, covers the various points in connection with the organization of a Tropical Agricultural College in the British West Indies. Topics discussed are desirability of establishment, situation, incorporation, constitution, curriculum, sugar school, oil technology, financial arrangements, college buildings, etc.—*J. S. Dash.*

110. SKLAWUNOS, C. G. *Die Organization des Forstpersonals in Griechenland und dessen Ausbildung.* [Organization and training of the forestry personnel in Greece.] *Forstwiss. Centrabl.* 42: 443-450. 1920.—The forest administration has been handicapped since its inception (1836) by the lack of trained personnel. Forest protection has been in charge of local police officials, and local financial officers issue cutting permits and conduct sales. The foresters (Oberförster) include provincial police officers, who are now required to have a 3-months' training in forestry, and some 30 professional foresters (out of a total of 105) who

have had a short training at various Austrian schools.—The first school of forestry was established in 1896 at Vytina and serves principally for training forest guards. A school forest of 16,000 hectares (chiefly *Abies cephalonica*) serves as a field for practical training. Two other similar schools are to be established, 1 in the Aleppo pine forest Chalandriou in Attica, the other in the hardwood forest Agyia, in the Mt. Olympus region.—For training the administrative personnel, the State sends a certain number of students each year to Austria. The law of 1917 provides for a higher forest school at Athens, to give a complete 4-year course. The curriculum is described. The number of students, fixed by the Minister of Agriculture, has so far been from 15 to 25 each year.—*W. N. Sparhawk.*

111. SLATE, WILLIAM L., JR. The first college course in field crops. *Jour. Amer. Soc. Agron.* 13: 59–63. 1921.—Type, aims, content, and method of teaching the course are outlined. Its relation to the sciences, to specialized courses in crops, to farm experience and high school agriculture are shown. The author would place the course in the freshman year and allow 3–5 hours credit.—*F. M. Schertz.*

112. STEVENSON, W. H., AND P. E. BROWN. The teaching of soils in agricultural colleges. *Jour. Amer. Soc. Agron.* 13: 63–70. 1921.—The authors advocate uniting all branches of soil instruction in one department. A 4-year agricultural course should include 4 or 5 courses in soils, such as: Soils, soil-fertility, manures and fertilizers, soil management and soil bacteriology. The laboratory work for these courses is also outlined.—*F. M. Schertz.*

113. WAGNER. Neuordnung des forstlichen Unterrichts für Württemberg bezw. Südwestdeutschland. [Suggestions for reorganization of forestry instruction in southwest Germany.] *Allg. Forst- u. Jagdzeitg.* 1919: 245–251. 1919.—Of the numerous forest schools that were established in Germany only 9 remained in 1900,—4 in North Germany and 5 in South Germany. Recently 2 more were abandoned, leaving only 7. Now Prof. Wagner, of the forestry faculty of the University of Tübingen, recommends a still further consolidation. The states of Württemberg, Hesse, and Baden, instead of having separate forest schools, which must necessarily be small in size and inadequately equipped, should bring together all their instruction in forestry in one well-equipped school, and Prof. Wagner suggests that it would be located at Heidelberg, with Tübingen as a second choice.—*Joseph S. Illick.*

114. WEATHERBY, C. A. What the Latin names mean—II. *Amer. Fern Jour.* 11: 25–27. 1921.—The article completes the list of specific names started in the *Amer. Fern Jour.* 10: 115–119. 1920.—*F. C. Anderson.*

115. WENTZ, JOHN B. The standardization of courses in field crops. *Jour. Amer. Soc. Agron.* 13: 52–59. 1921.—Colleges of the U. S. A. offer 133 differently named courses in field crops; these courses when classified as to ground numbered 47 and of these 47 only 20 are offered by more than one or two colleges. A table shows that great irregularity exists in the positions of the field crop courses in the college curricula. Another table shows that great variation is found in the number of hours devoted to the different courses by different colleges. Difference in importance of some crops in different parts of the country accounts for some of the variation.—*F. M. Schertz.*

116. WOLK, P. C. VAN DER. De Botanische Tuin in Lissabon. [The Botanical Garden in Lisbon.] *Aarde en haar Volkeren* 57: 108–110. *Fig. 1–4.* 1921.

ECOLOGY AND PLANT GEOGRAPHY

H. C. COWLES, *Editor*

GEO. D. FULLER, *Assistant Editor*

(See in this issue Entries 79, 80, 127, 134, 141, 158, 196, 198, 199, 209, 345, 346, 347)

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*J. V. HOFMANN, *Assistant Editor*

(See also in this issue Entries 30, 63, 83, 101, 110, 113, 306, 439, 452, 466)

117. ANONYMOUS. Annual administration report of the Afforestation Division [United Provinces, India] for the financial year 1919-20. 28 p., 3 pl. Government Press: Allahabad, 1920.—The report covers the work of the United Provinces Forest Service in reclamation of land ruined by erosion following denudation. It is estimated that there are 8,000,000 acres of denuded or eroded waste land in the Province, of which 23,768 acres are under government control, and 4,083 acres are being actively afforested. The report considers the constitution of state forests; summary of works carried out; exploitation of areas under reclamation; history of afforestation in the United Provinces; a copy of the agreement made with owners of ravine waste land; final report on famine relief operations; and financial statements. The afforestation projects are designed to furnish reserve supplies of fodder and fuel, and to stabilize and reclaim eroding areas. Of the many trees and grasses that have been experimented with, *Acacia arabica* and *Dalbergia sissoo* are the most satisfactory trees, though *Gmelina arborea*, *Tectona grandis*, *Holoptelea integrifolia*, and certain bamboos show great promise. The cost of reclaiming and afforesting is about 60 Rs. per acre. It has been found satisfactory to use reclamation projects to provide government relief for famine sufferers as all classes of labor can be employed, and the work can be closed at any time without being left incomplete.—*Winfield Dudgeon*.

118. ANONYMOUS. Ce que valent chênes et frênes sur pied. [Oak and ash stumpage prices.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 277-278. 1920.—Oak stumpage prices are now approximately 30 per cent higher than a year ago in the Vosges and Haute-Saône. The present stumpage price of oak can be determined roughly by doubling the diameter of the tree (in cm.) and subtracting 10 francs; of ash by doubling the diameter and adding 10 francs. Prices for both species are still increasing.—*S. T. Dana*.

119. ANONYMOUS. Congrès de 1920. [Congress of 1920.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 212-258. 1920.—The annual meeting of the forestry society of Franche-Comté and Belfort was held at Champagny, August 9-11, 1920. In addition to the usual banquet and general assembly, field excursions were made to a number of neighboring forests. Separate abstracts are given of the speeches made and of the descriptions of the forests visited.—*S. T. Dana*.

120. ANONYMOUS. Entwurf eines preussischen Gesetzes über Kahlschläge in Privatwäldungen. [Proposed Prussian law regulating clear cutting in private forests.] Deutsch. Forstzeitg. 36: 39-41. 1921.—The proposed law forbids clear cutting of more than $\frac{1}{10}$ of the area of a forest unit, or excessive thinnings, without special permit. It applies to high forests, or similar forests, but not to coppice forests. All privately owned forests are subject to this law except those managed cooperatively, which are already provided for. This law is intended to prevent forest devastation, which is threatened, especially near the towns, until the proposed new law regarding forest culture can be passed and made effective. At present there is no legal way to prevent devastation of private forest lands in Prussia. Comments on the law, by Dr. BERTOG, are appended.—*W. N. Sparhawk*.

121. ANONYMOUS. Errichtung von Forsteinrichtungen in Preussen. [Establishment of forest regulation office in Prussia.] Forstwiss. Centralbl. 42: 267-270. 1920.—The organization of a new working-plans office in the Prussian state forest service is described which will put the work of regulating the cut in the hands of specialists, and will also save the treasury considerable money.—*W. N. Sparhawk*.

122. ANONYMOUS. Exportation des bois de feu et du charbon de bois. [Exportation of firewood and charcoal.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 258-260. 1920.—At its annual meeting in August, 1920, the forestry society of Franche-Comté and Belfort adopted a resolution asking the government to remove the prohibition on exports of firewood and charcoal because in eastern France available supplies were considerably in excess of local needs. The assistant secretary of agriculture replied that while it was impossible to alter present restrictions immediately because of the great need in France for fuel of all sorts, he would attempt to find a market for firewood and charcoal from this region, and that where production remained in excess of consumption he was inclined to look favorably upon permitting such exports as might appear justified.—S. T. Dana.

123. ANONYMOUS. Studies in British forestry. Nature 106: 646-647. 1920.—Review of bulletins 1, 2, and 3 of the Forestry Commission and comments on the work of the commission.—O. A. Stevens.

124. ANONYMOUS. Voeux votés par les conseils généraux de la Haute-Saône et du Jura tendant à l'augmentation de la production du bois d'œuvre. [Increasing the production of timber.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 283-288. 1920.—The general councils of the departments of the Haute Saône and the Jura have expressed their desire to support the efforts of the forest service; to secure the submission to the forest regime and the reforestation of waste areas belonging to the communes; to increase the proportion of conifers in the mountains; and to convert the stands of broadleaf coppice in the plains into high forest by increasing the number of young reserves. The conservators of waters and forests in these 2 departments have expressed their approval of this program to increase the production of timber, and have issued instructions accordingly to the forest force.—S. T. Dana.

125. ANONYMOUS. [Rev. of: BOYD, J. Afforestation. 39 p. W. R. Chambers, Ltd.: London, 1918.] Sci. Prog. [London] 14: 350. 1919.

126. ANONYMOUS. Conifers. [Rev. of: COLTMAN-ROGERS, CHAS. Conifers and their characteristics. xiii + 333 p. John Murray: London, 1920.] Nature 106: 563. 1920.—Popular. Contains some errors, but is well printed and instructive. [See also Bot. Absts. 9, Entry 133.]—O. A. Stevens.

127. ANDERLIND. Darstellung des Verhaltens der Holzarten zum Wasser. [Water relation of different forest trees.] Allg. Forst- u. Jagdzeitg. 96: 29-40. 1920.—The concluding chapter of a consideration of the water relation of specific forest trees. The species considered are green Sitka spruce, green Douglas fir, Colorado blue spruce, and white spruce. These 4 species have been introduced extensively into Europe, but Douglas fir introduction surpasses all others. The experimental plots of this species comprise 365 acres in Prussia.—Joseph S. Illick.

128. ARNDT. Wie kann die heimische Holzproduktion ohne Vergrößerung der Waldfläche gehoben werden? [How to increase wood production without increasing forest area.] Zeitschr. Forst- u. Jagdw. 52: 89-94. 1920.—Compulsory cooperation of small woodland owners is recommended as a means of increasing wood production without increasing the area of forest land.—Joseph S. Illick.

129. BEEKMAN, H. A. J. M. Economische gevolgtrekkingen voortr loeiende uit een analyse van den djati-opstand en van het djati-boschbedrijf op Java. [Economic conclusions derived from an analysis of djati growth and djati forest management in Java.] 168 p., tables 1-4. Wageningen, 1920.—A general account is given of the management of djati forests (*Tectona grandis*) in Java.—J. C. Th. Uphof.

130. BIEHLER. Kann man die Kiefer natürlich verjüngen? [Can Scotch pine be regenerated naturally?] Allg. Forst- u. Jagdzeitg. 96: 2-15. 1920.—The belief prevails among

foresters that Scotch pine cannot be regenerated successfully by natural reproduction methods. Clear-cutting followed by planting is the rule. The author, by citing numerous experiments and results therefrom, makes the claim that natural regeneration of Scotch pine is not only possible, but also practicable and to be recommended from an economic standpoint. The 2 principal factors upon which the successful natural regeneration of Scotch pine depends are soil condition and stand composition.—*Joseph S. Illick.*

131. BLOLEY, H. Betrachtungen über die Forsteinrichtung in der Schweiz. [Observations on forest improvement in Switzerland.] Schweiz. Zeitschr. Forstw. 72: 40-45. 2 pl. 1921.—An answer to Dr. FLURY in issues 9 and 10 of the "Jour. Forest. Suisse." The discussion is summed up under 4 heads: 1. "The relation of forest improvement and management." These can not be separated since they are interdependent. The best management is accomplished by securing the best species, which can be done only through forest improvement. In order to favor any desirable species cuttings must be on a basis to secure young growth of that species, and in this both management and improvement are involved. 2. "The determination of the current increment." The current increment during decades or periods is not a sufficient basis for methods of management unless the records are continuous. The variation of growth during various periods makes the records of little value unless they are taken continuously. Increment based on volume and age is not considered sufficient to determine growth. 3. "HEYER'S Formula." The formula has a far-reaching influence since it is accepted as a basis for finances, industry, and insurance. When all stands that have not passed middle age are omitted, $\frac{1}{2}$ of the forest area is not considered in summing up the increment. The formula arrives at an average over long periods but does not give current increment. 4. "The concessions of Dr. Flury." Flury admits that the current increment is necessary in selection cutting, and Biolley inquires why the same principle is not applied to all forest stands whether the young stands are in mixture or in pure stands, and the cutting regulated accordingly.—*J. V. Hofmann.*

132. BOULGER, G. S. [Rev. of: CHURCH, A. H. (1) Elementary notes on conifers. Bot. Mem. [Oxford] 8. 32 p. 1920; (2) Form-factors in Coniferae. Ibid. 9. 28 p. 1920.] Jour. Botany 59: 81-82. 1921.

133. BOULGER, G. S. [Rev. of: COLTMAN-ROGERS, CHARLES. Conifers and their characteristics, with illustrations. xiii + 333 p. John Murray: London, 1920.] Jour. Botany 59: 27-29. 1921. [See also Bot. Absts. 9, Entry 126.]

134. BOURQUET. Les déboisements du Ballon d'Alsace. [Deforestation of the Ballon of Alsace.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 225-237. 1920.—The upper basin of the Savoureuse River reaching a maximum elevation of 1,242 m. on the Ballon of Alsace contains 1,250 hectares, of which 1,150 are covered with a mixed high forest of broad-leaf and conifer species. From 1916 to 1919 unusually heavy and intensive cuttings in these stands led to the deforestation of some 300 hectares and seriously disturbed normal forest conditions over large additional areas. These changes resulted during the winter of 1919-1920 in unprecedented floods in the Savoureuse River the total direct damages amounting to 164,000 francs as against a maximum of 4,500 in any previous year. At the request of the local residents the state is now taking steps to establish zones in which reforestation is obligatory, under the laws of April 4, 1882, and August 16, 1913, and also to purchase some 580 hectares in the 2 principal forests.—*S. T. Dana.*

135. BRUNNHOFER, A. VON. Verwaltungsrecht und Holzhandel—zwei Vorlesungen die an der Schweizer Techn. Hochschule gehalten werden sollten. [Administration and timber sales—two subjects that should be taught in Switzerland.] Schweiz. Zeitschr. Forstw. 72: 65-74, 100-106. 1921.—With a minimum of 7 semesters in college and 1½ years practical experience required to pass the state examinations, the forester is not equipped to cope with the many phases of forestry and politics encountered on assuming the responsibility of a district of 4,000-13,000 hectares.—The public knows the forester only through political contact

and regards him as one who limits the activities of the people and dictates the forest policy as well as having police authority. These activities must be developed by experience and often work to the disadvantage of the inexperienced. The technical phases of forestry should also be emphasized, and the public should know that minor technical details often result in great savings to the community. With a thorough training in the handling of timber sales and the importance of technical administration, the forester is equipped to conduct the business of the forest, even in opposition of public sentiment because he knows the result will be for the common good.—In the second part special emphasis is placed on the importance of a knowledge of wood-using industries, logging, milling, and, above all, timber appraising. Uniformity in timber prices for all purposes and advertisement of prices is advocated.—*J. V. Hofmann.*

136. CARDOT, E. La question sylvo-pastorale. [Forests and grazing.] Rev. Eaux et Forêts 58: 323-329. 1920.—Individual trees, and still more groups of trees, are beneficial to grazing in mountainous regions because they break the force of the winds, moderate extremes of temperature, increase the relative humidity of the air and the formation of dew, decrease evaporation, and favor the propagation of the best forage plants. Trees are also necessary in such regions for the production of both timber and fuel. Difference of opinion exists as to whether trees, either singly or in groups, are more beneficial when scattered through the grazing areas or when segregated into distinct stands confined to the more exposed and least favorable sites and not open to grazing. The author adheres strongly to the latter view, and believes that the use of forests for grazing is detrimental to the best development of both trees and forage. France has so far paid too little attention to this very important problem, often with disastrous results.—*S. T. Dana.*

137. [CHRISTY, MILLER.] "Wistman's Wood." Jour. Botany 59: 74-75. 1921.—This is a reprint of an article by Christy in Proc. Linn. Soc. It is an account of an ancient grove of gnarled trees of *Quercus pedunculata*, in Dartmoor. Many accounts of this wood have been written. Perhaps the earliest was that of TRISTRAM RISDON just 3 centuries ago.—*K. M. Wiegand.*

138. CLERC, JEAN. Forêt communale de Champagney. [Communal forest of Champagney.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 212-215. 1920.—The communal forest of Champagney has been managed consistently since 1824 as coppice under standards with a rotation of 28 years. That part of it known as Terre aux Saints is about 70 per cent oak and 30 per cent beech and other species. It was heavily overcut during the war but still has some fine reserves.—*S. T. Dana.*

139. COLLEY, REGINALD H. The effect of incipient decay on the mechanical properties of airplane timber. [Abstract.] Phytopathology 11: 45. 1921.—Tests of sound and decaying wood of Sitka spruce (*Picea sitchensis* Carr.) and Douglas fir (*Pseudotsuga mucronata* Sudw.) showed that incipient decay produced by *Fomes pinicola*, *F. laricis*, and *Polyporus Schweinitzii* weakened the timbers very markedly, while pieces infected with *Trametes pini* were as strong or stronger than sound wood.—*B. B. Higgins.*

140. COVENTRY, B. O. Progress report of forest administration in the Jammu and Kashmir State for 1917-1918. 77 p. Lahore, 1920.—The usual annual report is presented. At the close of the year the total of all classes of forests was 9,495 square miles of which 8,859 were demarcated. It is stated that natural regeneration in the coniferous forests is only fairly satisfactory but varies considerably in different localities. In the Chir pine forests natural regeneration is usually very prolific provided the forests are protected from fire. Natural regeneration of deodar is good in the Lolab forest but not so satisfactory in the forests of the Kishenganga valley. On bare hill sides natural regeneration of blue pine is very conspicuous. In the broad-leaved forests natural regeneration from coppice shoots is usually satisfactory provided the areas after being felled are protected against cattle. Formal statistical statements for the year are appended.—*E. R. Hodson.*

141. CUBITT, G. E. S. Wood in the Federated Malay States. 31 p., 4 maps. Government Press: Kuala Lumpur, 1920.—The forests, their distribution, and, in the view of the author, the great necessity of their conservation are discussed.—*I. H. Burkill.*

142. DEMORLAINE. Forêt communale de Plancher-les-Mines. [Communal forest of Plancher-les-Mines.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 253-255. 1920.—This forest, 37 per cent fir, 17 per cent spruce, 34 per cent beech, and 12 per cent other species, was managed until 1913 as a regular high forest with a rotation of 144 years. In 1913 steps were taken to convert it into a selection forest with the same rotation divided into 12 cycles of 12 years each. The annual yield is estimated at about 5 cubic meters per hectare. Previous cuttings of beech have been too heavy, and an effort should be made to maintain approximately the present proportion of this species.—*S. T. Dana.*

143. DEMORLAINE. Forêt domaniale de Saint-Antoine. [State forest of Saint-Antoine.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 255-258. 1920.—This, like most State forests, is at a higher elevation and further from the center of population than the adjacent communal forest. Composed of a mixed stand of broadleaf species and conifers, it is divided into 7 series with a rotation of 128 years. Five of these are treated as regular high forest, 1 as a protection forest, and 1 as an aesthetic forest. Silver fir reaches its optimum development here at an altitude of 600-1,200 m. and 1 specimen has a circumference of 4.4 m., a height of 45 m. and a volume of 30 cubic m. Rather heavy cuttings were made during the war, but these were handled so skillfully that the forest is in excellent condition.—*S. T. Dana.*

144. DIEDRICHS, A., UND L. KNÖRR. Babassonüsse und deren Öl. [Babasso nuts and their oil.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 152-153. 1920.

145. DIEDRICHS, A., UND L. KNÖRR. Das Samenöl des Condoribaumes (*Adenanthera pavonina* L.). [Seed oil of *Adenanthera pavonina*.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 153-155. 1920.

146. DIHM. Ein Nachteil der Fichtenlohrindengewinnung. [A disadvantage of spruce tanbark exploitation.] Forstwiss. Centralbl. 42: 399-401. 1920.—The shortage of tanning materials in Germany during and subsequent to the war was partly met by the use of spruce bark. Trees cut during the winter must lie in the woods until May to be peeled, but this results in very serious attacks by borers, which greatly reduce the value of the wood. It will be necessary either to give up peeling winter-felled trees, or to find means to peel them earlier so that the wood will become dry before the first beetle broods emerge in March.—*W. N. Sparhawk.*

147. EBERTS. Ergebnis der Harznutzung in einigen Staatsforsten des Regierungsbezirks Cassel im Jahr 1918. [Turpentine in state forests of Cassel in 1918.] Allg. Forst- u. Jagdzeitg. 95: 208-212. 1919.—The result of harvesting turpentine from Scotch pine and Norway spruce is presented. The expenditures and receipts are itemized. Scotch pine stands ranging in age from 60 to 105 years produced a net yield from turpentine of 210 marks per acre, and a net profit of 1.75 marks per kg., while Norway spruce produced a net yield of only 1.40 marks per acre and 0.12 marks per kg. The net return from collecting "wild" turpentine from Norway spruce, that is, from trees barked by deer and other animals, was 0.49 mark per kg. The study showed that frequent scraping of the bleeding surface increases the total yield. The surface should be scraped and scarred at least 5 times every 2 weeks, oftener if possible.—*Joseph S. Illick.*

148. ECKSTEIN, KARL. Beiträge zur Kenntnis des Hausbocks, *Hylotrupes bajulus* L. [Identification of wood-destroying house beetle.] Zeitschr. Forst- u. Jagdw. 52: 65-89. 1920.—A description of the life history, food habits, and damage of the wood-destroying beetle, *Hylotrupes bajulus* L. It attacks only coniferous wood and is common in building material. The larvae, which live from 3 to 11 years, perforate the wood with numerous channels and sometimes destroy it completely.—*Joseph S. Illick.*

149. ERDMANN, F. Gedanken über Waldwertrechnung. [Forest valuation.] Zeitschr. Forst- u. Jagdw. 52: 146-166. 1920.—A critical discussion of soil value, growing stock value, sale value, expectation value, cost value, and other important subjects of forest valuation. A complete classified list of kinds of value used in forestry is given.—*Joseph S. Illick.*

150. ESCHERICH, K. Die Generationen des grossen braunen Rüsselkäfers (*Hylobius abietis*). [Generations of the large brown weevil.] Forstwiss. Centralbl. 42: 425-431. 1920.—Investigators in different regions have disagreed as to the length of generation of the weevil, some finding a period of 15 months from egg to imago (2-year generation), others 12 months (1-year generation), and others 3-5 months (2 generations per year). All 3 positions are supported by reliable data. The difference appears to be due to climatic variations.—It is suggested that in regulated forests where the cutting is more or less concentrated in space and season the emergence of the beetles is likewise concentrated and more likely to prove harmful than where, as in a virgin stand, the beetles come out at various times through the year.—*W. N. Sparhawk.*

151. FALCK. Wege zur Kultur der Morchel-Arten. [Methods of cultivating Morels.] Zeitschr. Forst- u. Jagdw. 52: 312-323. 1920.—A plan to raise edible fungi by natural methods within the forest as a companion crop to the wood.—*Joseph S. Illick.*

152. FANKHAUSER, F. VON. Aufforstung und Verbauung im Hochgebirge. [Afforestation and terracing in the high mountains.] Schweiz. Zeitschr. Forstw. 72: 11-20. 1921.—The author takes exception to MARTI's contention that the high-mountain meadows should be afforested. He states that some of the areas are above the commercial timber line and that the stocking of those areas with trees would cause an endless controversy with the grazing industry. If the mountain lakes were drained and the meadows stocked with forests the construction of numerous terraces and dams would be necessary. The cost of such construction would be prohibitive and the upkeep high. The grass lands afford sufficient protection for ordinary rainfall and the excessive rainfall is rare as are also the cloudbursts or extraordinary showers in the mountains. Consequently the protection afforded at present is as good as can be provided. The construction of terraces or dams would not provide for the exceptional and excessive rainfall, and the resultant damage and danger would be greater.—*J. V. Hofmann.*

153. FINCKENSTEIN, FINCK VON. Künstliche Düngung im Walde. [Artificial fertilizing in forests.] Zeitschr. Forst- u. Jagdw. 52: 342-345. 1920.—An experiment was started in 1913 in a 60-year old Scotch pine stand developed in an abandoned field. The area was classed as site-quality IV or V for Scotch pine. The object of the experiment was to determine the effect of artificial fertilizer. Some of the demarcated plots were treated with quicklime at the rate of 1780 lbs. per acre; others with carbonate of lime at the rate of 3660 lbs. per acre. At the end of 6 years the limed plots showed a cross-sectional growth of the stems about 6 per cent above that of the plots not limed. There was also a perceptible difference in the forest floor cover vegetation on the treated and untreated plots.—*Joseph S. Illick.*

154. FLURY, PHILIPP. Die Fortbildung des sächsischen Forsteinrichtungsverfahrens. [The development of the methods of the forest institution of Saxony.] Naturwiss. Zeitschr. Forst- u. Landw. 18: 249-261. 1920.—A brief, critical review of a few of the more important topics discussed in a recent publication (Tharander Forst. Jahrb. 71: 30-57, 72-89. 1920) under the above title by Dr. Martin. The author criticizes the Saxon method of regulating the yield by the use of inflexible yield tables rather than by careful measurements of the timber resources, and contends that forest management must be more or less elastic and not entirely scholastic. It must accommodate itself to all cultural changes, must protect the forest from over-utilization through calculations of the forest resources (capital) and yields based on safe and established principles, and must abandon the idea, rather firmly established in Saxony, that the "calipers" are an unnecessary implement.—*J. Roeser.*

155. GREVE. Vorschläge zur Geschäftsanweisung für preussische Staatsoberförster. [Duties of Prussian State Oberförsters.] Zeitschr. Forst- u. Jagdw. 52: 129-140. 1920.—A comparative discussion of the duties of Prussian Oberförsters as set forth in the regulations of 1870 and what should now be regarded as their complete line of work.—*Joseph S. Illick.*

156. GURTU, S. K. Forests and irrigation: A plea for scientific preservation and growth of state forests and special cultures. Agric. Jour. India 16: 32-39. 1921.

157. GUYOT, CH. Pour la personnalité civile de l'École Nationale des Eaux et Forêts. [Making the National School of Waters and Forests a civil body.] Rev. Eaux et Forêts 58: 351-352. 1920.—The law of August 5, 1920, made the agricultural colleges of the country civil bodies ("persons"), and provided that in all their acts as such they should be represented by a director and administered by a council. These provisions should be extended to the National School of Waters and Forests, which is now nearly 100 years old and which could make good use of the rights and privileges accorded by such a status.—*S. T. Dana.*

158. HAUBER. Der Rückgang der Vegetationsgrenzen in den Alpen und ihre Bedeutung für die Almwirtschaft. [The retreat of the vegetation limit in the Alps and its significance for the dairy industry.] Forstwiss. Centralbl. 42: 436-443. 1920.—The retrogression of the upper limits of vegetation in the eastern Alps, and the decline or disappearance in many places of the dairy industry which formerly depended upon the high-mountain pastures, is due partly, perhaps, to climatic changes, but more to the acts of man. The cutting of alpine forests for timber, and the burning of brush-covered areas to improve pasturage, exposed the alpine meadows to the winds, with the result that grass and practically all other plant growth gradually disappeared. Overgrazing by cattle and, later, more serious overstocking with sheep, prevented reproduction of the trees, necessary to shelter the meadows, and also injured the forage cover, so that many areas which once supported abundant stock have become barren wastes. These conditions can be remedied only by establishing protective belts of brush and trees,—a long and costly task.—*W. N. Sparhawk.*

159. HECK. Kahlschlagwirtschaft am Hochgebirge. [Clearcutting methods on mountains.] Allg. Forst- u. Jagdzeitg. 95: 260-263. 1919.—A critical discussion of the possibilities of natural regeneration on mountain slopes. The advantages and disadvantages are discussed. Several experimental cuttings are cited.—*Joseph S. Illick.*

160. HELBIG, MAXIMILIAN. Zusammengefasste Ergebnisse der Karlsruher Stickstoffdüngungsversuche mit Fichten, ihre Bewertung und Stellung zu fremden Versuchsergebnissen. [Results of nitrogen fertilizer experiments with spruce.] Forstwiss. Centralbl. 42: 262-267. 1920.—The results of experiments in fertilizing spruce nursery stock, 1907-1917, are summarized. Full fertilization (potash, basic slag, and nitrates) applied to 2-year transplants produced greater height growth than partial fertilization (nitrates only) or no fertilization; and the effect persisted, although to a lesser degree, with another application of the fertilizers when the trees were transplanted at 4 years of age. On the other hand, fertilized transplants, set out in the open without fertilizer when 4 years old, grew more slowly than those not fertilized in the nursery bed, and at the end of the 8th year had lost their early gains and were shorter than the partially or unfertilized ones. Relative weight of root-system was less in the completely fertilized plants, but needle weights were about the same. The foliage of fertilized plants was of a deeper green color but apparently no healthier than that of the others. Transplanting reduced the height growth of both fertilized and unfertilized plants. The conclusion is reached that fertilization of young spruce with nitrates alone is not profitable, but that complete fertilization is advantageous in cases where tall planting stock is desired at an early age.—The author's results do not entirely agree with those of MÖLLER and ALBERT.—*W. N. Sparhawk.*

161. HIELSCHER. Zur natürlichen Verjüngung. [Concerning natural regeneration.] Deutsch. Forstzeitg. 36: 2-3. 1921.—Arguments for and against the use of natural reproduc-

tion are discussed with particular reference to a spruce forest in the Culm district (west Prussia).—W. N. Sparhawk.

162. HILF. Die Holzversorgung der Türkei und ihr Einfluss auf die Kriegsführung. [Wood supply of Turkey and its influence on the world war.] Zeitschr. Forst- u. Jagdw. 52: 346-360. 1920.—A record of observations on the forest conditions of Turkey taken on the expedition of General von Falkenhayn to Palestine in 1917-18. The conclusion is reached that the failure of the expedition is to be attributed entirely to the lack of an adequate wood supply. Railroad engines had to be fired with wood. A 6-hour run required that the tender be reloaded 3 times, each tender load costing 3,000 marks. When green wood was used it was impossible to keep up enough steam to cross steep grades. The entire region covered by the expedition was poorly forested. Lemon, orange, and olive groves dotted moist and warm places, and here and there near Jewish settlements Eucalyptus plantations occurred, which were established in the belief that the trees would keep away mosquitoes. The author suggests that Turkey and adjoining countries offer a fertile field for future forestry work.—Joseph S. Illick.

163. HOLLAND. Aus der Praxis der Forsteinrichtung in Württemberg. [Forest organization in Württemberg.] Tharander Forst. Jahrb. 72: 14-44. 1920.—A critical discussion of some of the principles of forest organization used in forest practices of Württemberg. Rotation, final and intermediate cuttings, felling budgets, compartments and subcompartments, yield, and reserve fund are among the subjects discussed. The first decade (1917-1926) of working plans for 1913-1936 are considered.—Joseph S. Illick.

164. HOLTEN, JUST. Alter und Zuwachs-Untersuchungen alter Eichen in lolländischen Wäldern. [Age and increment studies of old oaks in the forests of the island of Lolland.] Nat.-urwiss. Zeitschr. Forst- u. Landw. 18: 261-270. 1 fig. 1920.—A few of the giant oaks, which occur in scattered stands on the island, are described, the largest having a circumference of 900 cm. The particular type is confined to low, moist, stiff clay soils; the external features are not inherited, but are the result of favorable location and physical conditions. From a number of measurements, the author secured a diameter-increment curve from which he constructed 2 tables showing increment and age for various diameters. He also determined the basal areal increment and from it derived the rule that the basal areal increment remains constant above a diameter of approximately 100 cm., above which diameter-height growth ceases, and the size of the crown (total leaf area) remains constant. The greatest age determined (from a tree that fell in 1915) was 1059 years.—J. Roeser.

165. HUFFEL, G. Emploi de tracteurs à chenilles dans les exploitations forestières. [Use of caterpillar tractors in forest exploitations.] Rev. Eaux et Forêts 59: 40-42. 1921.—Experiments in the forest of Haguenau (Bas-Rhin) showed that a small, 35-horsepower caterpillar tractor weighing 660 pounds can easily climb slopes of 35-40 per cent and cross swamps, ditches, and small streams. It maneuvers readily in pole stands and does little or no damage to the soil, but is destructive to seedlings in areas under regeneration. The tractor is able to haul easily 3 pine logs with a total volume of more than 140 cubic feet, but is not recommended for extracting stumps. It fells 120-year Scotch pine at the rate of 350 cubic feet of timber and 1.5-2 cords of stump wood per hour, but is not satisfactory for felling hardwoods. It is not of interest in regions where logging is easy and not expensive, but can be used to advantage for removing logs in mountainous country without good roads or in other regions difficult of access or where team transportation is costly. Its usefulness in felling coniferous trees is limited to cases where it is desired to extract the stumps, as is usually the case, and then only when the labor of woodcutters is particularly expensive.—S. T. Dana.

166. HUNZIKER, W. Entgipfelung judger Wiesstannen durch die Waldwühlmus (*Hypodeus glareolus* Wagn.). [Topping of young white fir by the forest mouse (*Hypodeus glareolus* Wagn.).] Schweiz. Zeitschr. Forstw. 72: 97-100. 1 pl. 1921.—Damage by cutting of terminal buds had been noted in various localities for several years and had been attributed to squirrels, jays, cross-bills, or deer. The typical damage (near Argau) of clean-cut tips and branches

of young growth at 0.5-6 m. above ground cast suspicion on the mouse, known to be a good climber.—Burrows and trails were common under the injured trees, but few cut tips could be found. Direct observations and trapping in the trees demonstrated the above named mouse to be the cause of the damage.—*J. V. Hofmann.*

167. JACOB, W. R. LE G. Report on forest administration in the Andamans for 1918-19. 45 p. Calcutta, 1920.—The usual annual report with summarized statistical data. There is included a condensed statement covering the preceding 5-year period. In the South Division the surplus at the close of the year was 552,598 Rs., or 56.8 per cent of the revenues. This amount is offset by a deficit of 169,677 Rs. in the North Division, as the latter was organized during the year and timber extraction was not begun. A survey on 2-inch scale of the remainder of the forests of the North and Middle Andamans is required immediately, as timber utilization is about to begin. Considerable damage was done to rubber trees and seedlings in nurseries by heavy winds in June, 1918. Development of the forests, especially those of the North Andaman, necessitates a great increase in the staff, as regeneration of areas following clear cutting will require a large amount of trained supervision.—*E. R. Hodson.*

168. JUCHT. Naturverjüngung im Dürnbucherforst. [Natural reproduction.] Forstwiss. Centralbl. 42: 402-404. 1920.—This pine and spruce forest (in Bavaria) had been managed on a system of clear cutting followed by artificial seeding; results were not satisfactory. In 1911 natural regeneration was decided on and secured by using a modification of WAGNER's border-cutting method, and preparing the soil in advance of the preparatory cutting by removing most of the living soil cover as well as some of the dead litter in case much of the latter was present.—*W. N. Sparhawk.*

169. JUNACK. Weder Bodenreinertragswirtschaft noch Waldreinertragswirtschaft. [Soil rent and forest rent.] Zeitschr. Forst- u. Jagdw. 52: 166-168. 1920.—A review of the forest-rent and soil-rent controversy.—*Joseph S. Illick.*

170. KATZER. Grundlinien einer neuen Forst-Wirtschaftsphilosophie. [A new forestry point of view.] Allg. Forst- u. Jagdzeitg. 96: 16-17. 1920.—The author discusses some of the fundamental principles of forestry and presents a rational scheme of coordinating all branches of forestry.—*Joseph S. Illick.*

171. KENT, H. T. M. Report on the results of mechanical tests carried out on some Malayan timbers. 9 p. Government Press: Kuala Lumpur, 1920.—Dry weight, elastic limit, modulus of elasticity, and modulus of rupture of the timbers of 55 species of Malayan trees.—*I. H. Burkill.*

172. KINDLE, E. M. Mackenzie River driftwood. Geog. Rev. 11: 50-53. 1921.—Driftwood is a familiar feature on the shores of arctic America. Dr. FREDRIK INGVARSON (Die Triebhölzer auf dem Ellesmere-Land, Rept. of the second Norwegian Arctic Expedition in the Fram, 1898-1902, Vol. 3, No. 24, p. 1-57, Christiania, 1911) recognizes 3 main sources of driftwood: (1) the Yenisei and Lena rivers of Siberia, (2) the St. Lawrence, and (3) the coast of Norway. He does not mention the Mackenzie river, which Kindle considers second only to the Siberian rivers as a source of arctic coast driftwood. The Mackenzie river, although a great carrier of driftwood, is not itself a great producer. The supply comes mainly from its western tributaries, of which the Gravel and the Peele contribute large quantities; but the great bulk comes from the Liard river. In 1919 the vanguard of the main volume of the Liard driftwood reached Old Fort Good Hope on the lower Mackenzie about July 13. The writer reports that the immense volume of this floating mass of forest debris greatly exceeded anything previously seen or imagined. In general it formed a nearly continuous mass $\frac{1}{2}$ mile or more in width and in this closely packed condition occupied about 4 days in passing a given point. Spruce and poplar comprise the great bulk of the Mackenzie driftwood. "Here indeed is a mammoth supply of pulpwood delivered at tidewater, cutting and transportation free, that merits the consideration of any enterprising paper company which can

solve the commercial problem of transportation around the Alaskan coast." This vast contribution of driftwood eventually comes to rest chiefly on the coast of arctic America and the islands west of Greenland. A recent explorer reports finding fuelwood abundant 200-300 miles on either side of the Mackenzie River delta.—*E. R. Hodson.*

173. KREUTZER, E. *Reinertragslehre und Hönlingertheorie.* [The theory of net rentals and Hönlinger's theory (for forest valuation).] *Oesterreich. Forst.- u. Jagd. Zeitg.* 38: 35-36. 1920.—The 2 theories are discussed and it is shown how Hönlinger attempts by mere juggling of equations to prove the correctness of his method. The author concludes that both theories are incorrect; the 1st because it does not allow for all the elements which go to make up the forest capital, and confuses costs of management and costs of maintenance in its formula; the 2nd because it is based on a false formula for soil value, due to the conception that the net yield represents rental on the soil capital only rather than on the whole forest capital.—*W. N. Sparhawk.*

174. KUNKELE. *Die Umwandlung der reinen Kiefernbestände im Pfälzerwald.* [Conversion of pure pine stands.] *Forstwiss. Centralbl.* 42: 281-292. 1920.—The forests of the Palatinate cover about 150,000 hectares. In the 16th century they were composed mainly of oak and beech, with small amounts of pine, fir, and other broad-leaved species; now pine occupies more than half the area. The pine is shorter than in other parts of Germany and does not grow in such dense stands; therefore, it is desirable, in order to maintain good soil conditions and to increase the yield of wood per hectare, to mix other tolerant species with the pine. The present time is particularly favorable for making this change, because the abnormal demand for timbers and fuel wood allows extensive silvicultural operations in the stands of pole size. Methods for accomplishing the desired result in various sorts of pole stands, as well as in mature stands, are described.—*W. N. Sparhawk.*

175. LANGDON, LADEMA M. *Identification of mahoganies.* [Rev. of: DIXON, H. H. *Mahogany, the recognition of some of the different kinds by their microscopic characteristics.* *Notes Bot. School Trinity Coll. Dublin* 3: 3-58. 23 pl. 1919 (see Bot. Absts. 3, Entry 2017).] *Bot. Gaz.* 69: 189-190. 1920.

176. LEETE, F. A. *Report on forest administration in Burma for year ended June 30, 1919.* 315 p. Rangoon, 1920.—An annual report with statistical data, including also a review of the preceding quinquennium. The past 5 years have witnessed a growing interest in silvicultural problems. Whereas, previously, the mixed and uneven-aged character of the forests was held to make it impossible to break away from the diffused method of working known as the "selection system," it is today generally recognized that there are immense practical possibilities in artificial regeneration, and that it need no longer be confined to small areas in a few specially favorable localities. The size of the areas clear-cut in any one place need simply to be limited by the amount of ground that can be covered with young forest growth by artificial means. This makes possible profitable use of mechanical methods of extraction of timber to a far greater extent than could have been hoped for with the old diffused method of working,—a great step forward in the development of Burma's forests. "Utilization" also is undergoing great expansion. The industrial activity in India, caused by the war, has attracted the attention of many to the commercial potentialities of Burma's forest products. The paper pulp industry is at last progressing, many tanning materials are under investigation, and wood distillation is receiving attention. Some results have been obtained in box-making, indicating successful use of plywood for the purpose. Plans are being drawn up for the organization of a Forest Research Institute for the province. A modern drying kiln has been ordered from America to aid in the solution of the numerous problems connected with seasoning. The all-important problem of the mechanical extraction of timber from the forests has recently been studied in America, where such extraction is most highly developed, by the Chief Conservator, and an American forest engineer has just arrived in Burma to assist in advising on extraction methods. Two new Conservatorships,—one for research and one for utilization,—have just been created. At the close of the year the total area of reserved

forests was 29,336 square miles, and of unclassed forests 116,829 square miles. To some extent the expansion of forest revenue will depend on the amount of revenue which the government is able to put back into the forests. But, although the percentage of surplus to gross revenue is higher in Burma than in any province in India, forest revenue cannot be devoted exclusively to expenditures on forest development since it must be prorated in accordance with the needs of all lines of the government's work. The area under approved working plans is 10,855 square miles, and 18,425 square miles are unprovided for. In the future such plans will be based on the new system of concentrated exploitation and regeneration as shown by the revised Tharrawaddy working plan. In India, extraction roads tapping previously inaccessible forests, even when constructed at high cost, have proved exceedingly profitable. During the last few years the advanced cost of elephants has made it impossible to use the animals for the extraction of timber, except teak and possibly pyinkado (*Xylia dolabriformis*). The future regeneration of the bamboo forests of Burma must be by artificial methods as natural regeneration is too uncertain and requires the retention of seed bearers. "It may be taken as an axiom that no natural product can permanently withstand a heavy artificial demand without artificial assistance to aid it in reproduction and development."—*E. R. Hodson*.

177. LUDWIG. Ein Forstdüngungsversuch in einer verheideten Fichtenpflanzung. [An experiment in forest fertilizing in a heath plantation of Norway spruce.] *Zeitschr. Forst- u. Jagdw.* 52: 42-51. 1920.—An experiment established in 1914 in a 15-year-old stand of Norway spruce to determine the effect of mowing the heath plants, grubbing the surface soil, application of commercial fertilizer, inter-cropping of white alder, perennial lupine, and *Spartium scoparium*, and soil coverings with branches and broom. The experimental plot (390 × 520 feet) was located within a 30-acre plantation set out in 1903 using 4-year-old transplants spaced 4 × 4 feet. The entire plot was sub-divided into 48 quadrants (65 × 65 feet). The preliminary results show that the application of fertilizer alone neither stimulates growth nor suppresses the heath. An acceleration of growth was noted only where the physical condition of the soil was improved simultaneously with the application of the fertilizer.—*Joseph S. Illick*.

178. MARC. La forêt domaniale d'Abrechwiller au cours du XIX^e siècle. [The national forest of Abrechwiller during the nineteenth century.] *Rev. Eaux et Forêts* 58: 317-322, 345-350. 1920.—The forest of Abrechwiller, comprising some 3,570 hectares of nearly pure silver fir in the Basses-Vosges, was ceded to the state by the princes of Linanges in 1801 by the treaty of Lunéville. Heavily encumbered by rights of user, comparatively inaccessible, and almost without roads or other means of transportation aside from drivable streams, its management was unusually difficult. The first real working plan for the forest was prepared in 1858. Under this, rights of user were practically canceled, the reforestation of openings was secured rapidly by artificial seeding of Scotch pine and natural seeding of silver fir, and the entire stand was treated as high forest with a rotation of 120 years.—The Germans, after the annexation of Alsace-Lorraine in 1870, followed the same plan, and in addition pushed vigorously the construction of roads and trails and even of a logging railroad. In 1815, however, they made modifications which display certain features characteristic of German forest management throughout Alsace-Lorraine. These include (1) a unit of management that is administrative rather than economic, with nothing comparable to the French series; (2) a very flexible management which aims to treat each stand in accordance with its particular needs, but which tends to split the forest into an infinite number of parcels and subparcels; and (3) the absence of fixed rules of exploitation and the giving of a comparatively free rein to local forest officers.—During the past 20 years faulty reproduction cuttings and the superabundance of deer, which are very destructive of fir seedlings, have resulted in an almost complete lack of natural regeneration. To remedy this situation large areas of Norway spruce have been planted in spite of the fact that spruce is not well adapted to the site. Furthermore, complicated and confused methods, unaccompanied by any clear-cut plan of management, have led to the creation of such an infinite number of small heterogeneous parcels that the present forest resembles a "harlequin's cloak." In short, while the forest has undoubtedly increased in value during the 19th century, it has been reduced to a state of profound disorder from which it must now be rescued by the skill of the French foresters.—*S. T. Dana*.

179. MARTIN. Das Streben nach Gleichheit und Ungleichheit in der Forstwirtschaft. [Striving for and against uniformity in forestry.] Tharander Forst. Jahrb. 72: 45-61. 1920.—A comparative discussion of the methods of regeneration, both artificial and natural, used in Germany. The basic principles and objectives of many standard methods are given, and the actual results attained by each method are cited. Large unit management and small unit management, and even-aged and uneven-aged stands are compared. Some foresters favor uniformity within stands and differences between stands, while others prefer a mixed condition within stands. The author believes that there is good in both principles, that unnecessary variety should be avoided, and that undue effort should not be put forth to attain uniformity in stands.—*Joseph S. Illick.*

180. MARTIN. Das Verhalten von Kiefern-Buchen-Mischbeständen in ökonomischer Hinsicht, mit besonderer Rücksicht auf die forstlichen Verhältnisse Sachsens. [Mixed stands of Scotch pine and beech in Saxony.] Tharander Forst. Jahrb. 71: 269-282, 299-318. 1920.—Beech was originally common in the forests of Saxony. Through the use of clear-cutting methods and specializing in Norway spruce production, most of the beech has been eliminated. Recent studies show conclusively that it is desirable to bring back the beech. Mixed stands of Scotch pine and beech have advantages over pure stands of Norway spruce. They satisfy more fully the desire of forest owners, are less subject to damage by destructive agents, and keep the soil in a better productive condition.—*Joseph S. Illick.*

181. MARTIN. Die Bedeutung J. H. von Thuens für die Forstwirtschaft. [Forestry work of J. H. von Thuens.] Allg. Forst- u. Jagdzeitg. 95: 99-106, 131-137, 157-172. 1919.—A critical review of the most important research works of J. H. von Thuens, who was not a professional forester but who developed many original ideas along forestry lines and collected an enormous amount of valuable information, based chiefly upon forest experiments. Among the topics considered are land classification, wages, rate of interest, the relation of increment and growing space, and forest and stand yield. Results of sowing and planting Norway spruce are discussed and supported by several tables. The effect of different grades of thinning on Scotch pine is also discussed, and the yield of beech and oak in different site-qualities is given. A critical review of the subject of rotation and its influence upon yield is considered. The basic factors and conclusions on many important economic forest problems are reviewed in detail.—*Joseph S. Illick.*

182. MARTIN. Forêt domaniale de Cherimont. [State forest of Cherimont.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 250-253. 1920.—This forest, 50 per cent beech, 20 per cent oak, 15 per cent hornbeam, and 15 per cent other species, was formerly managed as coppice under standards with a rotation of 30 years. In 1860 its conversion into high forest was decided on and a working plan prepared. The new rotation was set at 120 years with 4 periods of 30 years each and preceded by a transition period of the same length. Some underplanting of silver fir is now being done with a view to increasing the proportion of conifers.—*S. T. Dana.*

183. MARTIN. Ist die Herabsetzung der Umtriebszeit und die Verminderung des Holzvorrats in den sächsischen Staatsforsten zulässig? [Is the lowering of the rotation and the corresponding reduction of growing stock in the state forests of Saxony admissible?] Tharander Forst. Jahrb. 71: 287-297. 1920.—The percentage of forest stands over 100 years old in Germany is 15.4, in Prussia 15.4, in Bavaria 21.0, in Württemberg 11.7, and in Saxony 3.6. The present rotation in Saxony is only 85-90 years; in other states it is higher. To lower the rotation still further is not to be recommended for economic and silvicultural reasons. If the cut must be increased it may be done by making heavier thinnings and by clear-cutting undesirable stands.—*Joseph S. Illick.*

184. MEISSNER. Versuche zur Hebung von Föhren und Fichtenkrüppelkulturen. [Attempts to improve stunted pine and spruce plantations.] Forstwiss. Centralbl. 42: 315-329. 1920.—The arrested development of pine and spruce stands, common in certain parts of the

Upper Palatinate, is attributed to plant and animal enemies, principally the heather,—which temporarily suppresses the young trees,—blight, and various leaf-rollers. Various methods of improving soil conditions have been tried in order to keep down the heather and enable the trees to resist the other enemies. The best results were obtained by grubbing out the heather, or by sowing broom, larch, or possibly *Pinus strobus* among the young trees. No benefit resulted from loosening the soil by blasting, from application of various fertilizers, from intersowing of lupine, pitch pine, or jack pine, or from modifying the silvicultural system so as to give the advance reproduction a start over the heather.—*W. N. Sparhawk.*

185. MOLDENHAWER, K. Enskinnat Jernbane. [Monorail.] Dansk Skovforenings Tidsskr. 6: 19-25. Fig. 3. 1921.—Review of article in Dutch by Professor TE WECHER. A description of a monorail for transporting logs from the woods. It consists of 1 ordinary rail laid on posts set in the ground; a wheel running on this rail carries a balanced carrier of logs on each side of the rail line. This method is in general use in Java. Its advantages are that it is cheaply constructed, does not require wide clearings or bridges, the grade is obtained by having posts longer or shorter according to the lay of the ground, and logs are readily carried over rough ground and across creeks, roads, and natural depressions. The speed of the loads can be controlled by a brake.—*J. A. Larsen.*

186. MÖLLER. Kiefer-Dauerwaldwirtschaft. [A continuous method of handling Scotch pine.] Zeitschr. Forst- u. Jagdw. 52: 4-41. 1920.—Twenty-nine years of experimenting (1884-1913) on the forest of Barenthor near Dobritz shows conclusively that an individual selection tree method or a small group selection method of natural regeneration of Scotch pine gives better results than any clear-cutting method. The new method improved the site-quality from an average of site-quality 4 to an average of site-quality 11, and brought about an increase in increment, yield, and growing stock. The author states that clear-cutting methods are unnatural and interfere with the stability of the forest organism. Individual stem and small group selection methods maintain a natural forest condition and insure the highest possible increment per cent with the highest possible and most valuable growing stock, and therefore with the best possible forest management.—*Joseph S. Illick.*

187. MÜLLER. Forstliche Mitteilungen aus dem preussischen Solling. [Forestry facts from Solling, Prussia.] Zeitschr. Forst- u. Jagdw. 52: 247-262. 1920.—Chapters 6 and 7 of a continued article on forestry in Solling. Norway spruce stands are discussed. Establishment of stands by seeding have been successful and economical. Planting of seedlings costs 140 marks per hectare while successful establishment by seeding costs only 78 marks. Mound planting is recommended for clear-cut areas of hardwoods.—*Joseph S. Illick.*

188. MÜLLER. Gedanken über die Barenthorener Wirtschaft. [Thoughts about forest management on the Barenthor forest.] Zeitschr. Forst- u. Jagdw. 52: 296-301. 1920.—A review of Oberforstmeister MOLLER's conclusion concerning the natural regeneration of Scotch pine in comparison with results of artificial regeneration.—*Joseph S. Illick.*

189. NEUMEISTER. Nonnengefahr für Sachsen. [Danger of Nun moth in Saxony.] Thar- and-Forst. Jahrb. 72: 62-64. 1920.—The Nonne, or nun moth, did considerable damage to forest trees in Saxony in 1906 and 1912. In 1920 it appeared again in such large numbers in several forest districts bordering Bohemia that special steps must be taken to hold it in check.—*Joseph S. Illick.*

190. PARCHMANN, W. Die Smaliansche Formel für Inhaltsberechnung von Stämmen und die Beurteilung derselben durch einige seiner Zeitgenossen. [Estimating tree volume by Smalian formula.] Allg. Forst- u. Jagdzeitg. 95: 109-111. 1919.—A critical discussion of the academic and practical advantages and disadvantages of Smalian's formula for computing the volume of tree stems.—*Joseph S. Illick.*

191. PASSLER, JOHANNES. Die Bedeutung des Eichenholzes in gerberischen Beziehung und die daraus hergestellten Eichenholzauszüge. [Oak wood and oak wood extract in the tanning industry.] Forstwiss. Centralbl. 42: 241-249, 306-314. 1920.—Production of tannin from oak wood began about 1883 in Slavonia and Croatia, developed later in France and North America, and during the war was tried in Germany. Results of analyses are given which show that the tannin content increases with age of the tree, and is greatest in the lowest part of the bole. Sapwood contains very little tannin; the greatest amount is in the outer layers of heartwood. Young trees (under 20 years) contain too little tannin to be worked profitably. Tannin content of at least 5 per cent (air-dry weight, moisture content 14.5 per cent) is necessary for profitable operation, but the amount present varies from about 1 per cent in young sprouts, to 13 per cent, rarely exceeding 9 per cent.—The method of making the extract is described, and compositions of various extracts are given. Oak wood extract, which is different from oak bark extract, is very similar to chestnut wood extract, and gives about the same results. It is generally used in combination with chestnut, quebracho, or spruce extract.—*W. N. Sparhawk.*

192. RATTINGER, K. Die Holzvorräte der Pacifischen Nordwestküste mit besonderer Berücksichtigung von Britisch-Columbien und des südlichen Kieferngebietes der Vereinigten Staaten. [The wood resources of the Pacific Northwest.] Forstwiss. Centralbl. 42: 293-305, 360-374. 1920.—The forest regions of Canada are described in some detail, and more particularly the Pacific Northwest. For the latter region, including both northwestern U. S. A. and British Columbia, the stands of timber, annual cut, and possible cut, are discussed. The markets for the 2 parts of the region are compared, showing that of the northwest coast woods supplied to countries bordering on the Atlantic Ocean, the United States furnishes $\frac{2}{3}$, while it supplies $\frac{1}{3}$ of the exports to countries bordering on the Pacific (excluding California). The Pacific Northwest and the southern yellow pine regions are compared with respect to amounts of standing timber, annual cut, and annual growth, and the conclusion is drawn that southern pine will soon cease to be a serious competitor of the northwestern woods.—*W. N. Sparhawk.*

193. RAUX, MARCEL. Le calcul de la perte de valeur d'avenir et la question des réparations forestières. [Calculation of the loss of future value and the question of forest reparations.] Rev. Eaux et Forêts 59: 1-10. 1921.—Official instructions for determining the reparations due from Germany as a result of forest destruction in France provide for including in the estimated damage the loss of future value in the case of trees or stands destroyed prior to the normal age of exploitation. A simple method of determining this loss without the use of compound interest formulas is as follows: Estimate the volume, and from this the value, of the tree on the basis of its diameter in 1914 and of its normal diameter at maturity (assumed to be 40 cm.). The difference between these values gives the gross loss in future value; and this gross loss divided by the ratio between the value at maturity and the value in 1914, gives the net loss. While this method avoids any determination of the 2 unknowns,—rate of interest and number of years to maturity,—in the usual compound interest formula, it gives precisely the same result, since the ratio between the value at maturity and in 1914, $\frac{V^1}{V}$, is equal to 1.0 pn for the diameter selected. It is inaccurate to use a single rate of interest as applying to the yield of a tree or stand throughout its life since the rate varies greatly according to such factors as age, size, and estimated maturity. Thus by the method just described, assuming that a tree increases 5 cm. in diameter every 10 years and that its diameter at maturity is 40 cm., the future yield in the case of oak is found to vary from 66 per cent for trees 15 cm. in diameter to 3 per cent for those 35 cm. in diameter. To illustrate the importance of including the loss of future value in reparation calculations, a typical case is cited in which this value amounted to 30 per cent of the value of the high forest and to 62 per cent of the value of the young reserves.—*S. T. Dana.*

194. REBEL. Schlagruhe und Rüsselkäfer. [Suspension of cutting and weevils.] Forstwiss. Centralbl. 42: 335-336. 1920.—Comments on a recent article by SCHEIDTER (see Bot. Absts. 7, Entry 146).—*W. N. Sparhawk.*

195. REUTER, M. Die Waldweider. [Forest grazing.] Allg. Forst- u. Jagdzeitg. 96: 40-45. 1920.—As a consequence of the feed shortage during the period of the war, as was also the case in the dry summers of 1893 and 1911, there was a marked increase in forest grazing. The author enumerates the damage to forest growth by grazing animals, and the effect of the latter upon other destructive agents. It is the author's belief that forest grazing will again be reduced to a minimum when normal economic conditions are restored.—*Joseph S. Illick.*

196. RUBNER, K. Baumkronenform und Schattenfestigkeit. [Crown form and tolerance.] Forstwiss. Centralbl. 42: 249-258. 1920.—MAYR's law, that a given species needs less light in a warmer climate and more light in a cool climate, is not entirely true. Several trees, notably Scotch pine, spruce, larch, and oaks, increase in tolerance eastward and northward from western Germany, and are also more tolerant at the higher elevations than on the plains. There appears to be a fairly constant relationship between tolerance and form of crown, not only for the species mentioned but also for others, such as the birch, aspen, and Austrian pine. Toward East Prussia and western Russia the crowns become narrower, the trees stand closer together, their boles are more cylindrical, and height growth is more rapid. Moreover, in contrast to conditions prevailing in western Germany, natural reproduction is abundant under the shade of the old stands.—*W. N. Sparhawk.*

197. RUBNER, K. Die Krisen am Holzmarkt. [Crises in the timber market.] Forstwiss. Centralbl. 42: 353-360, 405-415. 1920.—The author discusses the relation of the timber market to general economic conditions, and traces the fluctuations in timber imports and in timber prices in the important German states, in relation to cycles of general prosperity and depression. This relationship began with the development of a world trade in timber, in the 1860 decade. Timber has certain advantages over coal, iron, or wheat as an indicator of economic conditions, because coal and iron production and prices, being manipulated by syndicates, do not respond readily to changes in the ratio of demand to supply, while wheat production and prices depend very largely on crop conditions and to some degree upon the tariff. Timber does not have to be marketed if conditions are unfavorable except in certain cases, such as forced cuttings due to wind or other damage.—*W. N. Sparhawk.*

198. RUBNER, K. [Rev. of: BJÖRKENHEIM. Beiträge zur Kenntnis einiger Waldtypen in den Fichtenwäldungen des deutschen Mittelgebirges. [Studies of forest types in the spruce forests of central Germany.] Helsingfors, 1917.] Forstwiss. Centralbl. 42: 457-463. 1920.—Björkenheim, working along the same lines as CAJANDER, presents the results of studies of more than 200 spruce stands in the mountain forests of central Germany. He classifies the stands on the basis of the characteristic predominant plants in the surface vegetation (*Oxalis*, *Oxalis-Myrtillus*, *Aira*, *Myrtillus*, *Calamagrostis*). This vegetation, being a resultant of the various site factors, is a very good index of the wood-producing power of the site, as the author shows by correlating height, diameter, and basal area growth of the spruce with the sub-types described. These different sub-types call for different silvicultural treatment.—Rubner says that such conclusions are more applicable to the extensive virgin forests of Finland, northern Scandinavia, and northern Russia, than to the artificial forests of Germany where the natural vegetation has been greatly modified by neighboring cultivation of meadows and agricultural crops. Björkenheim's studies were made in the less disturbed mountain forests. Such studies of the forest vegetation are decidedly worth while because of the new points of view they afford, even though such positive results as those of Cajander and Björkenheim cannot usually be expected.—*W. N. Sparhawk.*

199. SCHÄDELIN, W. von. Beiträge zum Kapital Spätfrost. [Contributions to the discussion of late frosts.] Schweiz. Zeitschr. Forstw. 71: 329-344. 4 pl. 1920.—Late frosts are common in the higher elevations of Switzerland in the region between the Jura and the Alps, and have a noticeable effect on the forests. An area of about 180 m. by 110 m. at an elevation of 559 to 581 m., was clear-cut. The natural reproduction was seriously frost injured due to the cold air drainage whereas the timber protected the young growth under it. Planted

stock of white pine was also frost injured. A small amount of larch seed was sown and a few trees survived. These are being crowded out by the hardwoods. Hardwood coppice was seriously injured by late frosts. Shoots 3 m. high and of the diameter of a cane were killed. The deepest portions of the area suffered the greatest damage. Heavy frosts occurred as late as June 6 in 1918. It is recommended that the dangerous places be planted with hardy conifers and that they be planted densely in order to provide for possible loss. Some species apparently become more frost hardy, although most of them recover rapidly if the late frosts are at intervals sufficiently long apart.—The species concerned are arranged in order of frost hardness. The least frost resistant are the walnut, ash, beech, fir, oak, and spruce; medium resistant are the native oak, maple, hornbeam, and elm; the hardy trees are the white pine and the Scotch pine.—*J. V. Hofmann.*

200. SCHAEFFER. Un essai de futaie jardinée feuille. [A trial of broadleaf selection forest.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 239-247. 1 fig. 1920.—While coppice under standards is undoubtedly the most widely used method of treatment in France, it has long been recognized that it falls far short of producing the maximum amount of timber. The classic method of converting such stands into high forest is too slow, too complicated, and involves too great a sacrifice of present returns to be practicable. A more feasible method, which is already virtually in use in many places, is to establish by relatively frequent improvement cuttings a selection high forest in which the number of trees is inversely proportional to their diameter. This method, with cuttings about every 15 years, makes it possible to favor the most promising seedlings and saplings, to remove mature trees most advantageously, and to establish a high forest with a good yield of timber without sacrifice of present revenue. Conditions vary so widely that no set rules for applying the method can be laid down, and a thorough knowledge of silviculture is necessary to use it to advantage.—*S. T. Dana.*

201. SCHÜPFER. [Rev. of: REUSS, HERMANN. Der Forsthaushalt aufgelöst in seine praktischen Einzelverrichtungen auf dem Gebiet der Wirtschaft und Verwaltung. Leipzig und Wien, 1918.] Forstwiss. Centralbl. 42: 272-273. 1920.—The particular purpose of this book is to acquaint forest owners with the general principles of forest management, and it is written in such a way as to be readily comprehended by persons who have no technical training in forestry.—*W. N. Sparhawk.*

202. SCHWAPPACH. Der Reichsforstwirtschaftsrat und das forstliche Vereinswesen. [National forestry departments and forestry associations.] Zeitschr. Forst- u. Jagdw. 52: 140-146. 1920.—A discussion of the scope and results of work of national departments of forestry and forestry associations, including the German forestry association and local associations.—*Joseph S. Illick.*

203. SIEFERT UND HELBIG. Weitere Ergebnisse der Stickstoffdüngungsversuche mit 2- und 4-jährigen Fichten. [Fertilizer experiments with spruce transplants.] Forstwiss. Centralbl. 42: 258-261. 1920.—Results of further observations (1914-1917) on the height growth of spruce transplants, some unfertilized and others treated in 1909 with various fertilizers are presented. The plants to which nitrate fertilizers had been applied showed more rapid growth during the first few years, but by 1917 had been almost overtaken by the unfertilized ones, whose actual and percentage growth was at that time considerably greater.—*W. N. Sparhawk.*

204. STEPHANI. Forstliche Vereine. [Forestry associations.] Allg. Forst- u. Jagdzeitg. 95: 205-208. 1919.—A suggestive discussion of forestry associations and societies. The need for such associations is outlined, and 3 distinct kinds of associations are recommended: (1) Associations for the promotion of forestry; (2) associations which uphold the interest of forest property owners; (3) associations of forest officers.—*Joseph S. Illick.*

205. STOLP, W. Impregneeren van hout. [Impregnation of timber.] De Natuur 41: 69-72. Fig. 1-4. 1921.—A general account is given of the impregnation of wood by various agents under normal and high pressure, as practiced in the Netherlands.—*J. C. Th. Uphof.*

206. TREBELJAHR. Kiefern-Dauerwaldwirtschaft. [Continuous method of handling Scotch pine.] Zeitschr. Forst- u. Jagdw. 52: 289-296. 1920.—A critical discussion of the position taken by Oberforstmeister MÖLLER in recommending the natural regeneration of Scotch pine by a method which he terms continuous forest management.—*Joseph S. Illick.*

207. VANSELOW. Von der Spessarteiche. [The Spessart oak.] Forstwiss. Centralbl. 42: 345-353. 1920.—The Spessart oak is the most valuable product of German forestry. Its wood is in great demand for furniture and brings extremely high prices,—9560 marks per cubic meter in 1920 for 1st class material, and 6995 marks per cubic meter for all grades, as compared with 82 marks in 1901. Being grown on a rotation of from 200 to almost 500 years, the trees are exceptionally large and straight, with boles clear of branches for 20 to 25 meters and with a diameter of from 2 to 4 feet. The oak is usually started in pure stands, and underplanted with beech after it is about 100 years old. Another method is to start both oak and beech at the same time. Each method has certain advantages and disadvantages, but both have shown that beech is absolutely essential for the best development of the oak when grown on such long rotations. Silvicultural treatment of the stands is discussed in some detail.—*W. N. Sparhawk.*

208. VATER. Der Kalkgehalt des Bodens und die Buche. [Lime content of soil and beech.] Tharander Forst. Jahrb. 71: 319-329. 1920.—Beech requires more lime than fir, spruce, or pine. SCHRODER found that a pure stand of beech on an average site requires annually 41.7 kg. per acre, while fir requires only 33.5, spruce 28.4, and pine 10.6 kg. Only a portion of the lime absorbed goes into the wood; most of it goes into the leaves and with their fall and decomposition again becomes available. Of all the principal European forest trees the beech most completely checks the leaching out of the soil. It is a protector of the soil, and lime will stimulate its growth.—*Joseph S. Illick.*

209. WHITFORD, H. N. The Patagonian forests. [Rev. of: ROTHKUGEL, MAX. Los Bosques Patagónicos. Buenos Aires, 1916.] Geog. Rev. 11: 141. 1921.

210. WILBRAND, R. Wald und Rente. [The forest and income.] Allg. Forst- u. Jagdzeitg. 95: 197-200. 1919.—A discussion of the real goal of municipal forests, and a technical discussion of various forms of forest management and forest income. Financial consideration must not overshadow other important and essential factors. The city of Düsseldorf bought from the state of Prussia a tract of forest land, for which 2,000 marks per acre were paid for the soil alone and an additional amount for the growing stock. It is estimated that the best financial return that can be hoped for is about 0.75 per cent on the capital invested. The city of Giessen in Hessen bought city forest land for 1184 marks per acre, of which only 236 marks was figured for the soil value. In spite of the high price paid for the land, the purchases are justified fully by the indirect benefits, which the author believes should be given greater weight than the financial consideration. In an appended short review Dr. WIMMENAUER concurs with most of the author's conclusions.—*Joseph S. Illick.*

211. WILBRAND. Waldrechnung und Weltrechnung. [Forest finance and world finance.] Zeitschr. Forst- u. Jagdw. 52: 337-342. 1920.—A general discussion of the influence of the rate of exchange, rise in price, and other economic factors on forest finance and general world finance. The article shows the effect of compound interest calculations in normal times and compares the period of the war and since the war with pre-war prices and conditions.—*Joseph S. Illick.*

212. WIMMER. [Rev. of: RUBNER, KONRAD. Die Bewegung der Holzpreise in Deutschland vom Beginn des Weltholzhandels bis zum Welt-Krieg. (Movement of timber prices in Germany.) Neudamm, 1920.] Forstwiss. Centralbl. 42: 453-456. 1920.—A very comprehensive and detailed study, with diagrams and tables, of timber prices in all of the German states for which such figures are available for the period 1875-1914. Economic laws governing the formation of timber prices are discussed, and the relation between such prices and the general economic situation is shown.—*W. N. Sparhawk.*

213. WITZGALL, L. Der Langenbrander Schirmkeilschlag von Forstmeister Dr. Eberhard und der Wagnersche Blendersaumschlag in Gaildorf. [The Langenbrand shelterwood wedge cutting and Wagner's selection strip cutting.] Forstwiss. Centralbl. 42: 431-436. 1920.—A discussion and comparison of these 2 silvicultural methods, both of which aim to establish the new stand by means of natural reproduction.—*W. N. Sparhawk.*

214. ZWILLING, C. La conversion des taillis sous futaie du département de la Moselle en haute futaie. [Conversion of coppice under standards into high forest in the department of Moselle.] Rev. Eaux et Forêts 59: 33-39. 1921.—In 1830 the French forest administration began the conversion into high forest of a part of the 32,600 hectares of broadleaf national forests in the department of Moselle. These had previously been managed as coppice under standards, as are most of the communal and private forests today. The rotation of the coppice was reduced from 25 or 35 to 20 years and the number of reserves was gradually increased during successive cuttings so as to form a selection high forest. The work was continued by the Germans after the annexation of Alsace-Lorraine, but in 1882, as a result of decreased prices for fuel wood, they made the mistake of undertaking the conversion of all the national forests. This resulted in failure on the thin, clayey soils not suited to the production of broadleaf high forests. Another later mistake, which was, however, soon rectified, was the application of a rigid diameter limit, sometimes with disastrous results. Aside from this the forests under conversion were in general well cared for. Thinnings as well as reproduction cuttings were used in effecting the conversion and were carried out in the lower as well as the upper story. Double high forests were often established in which the rotation of the upper story, usually oak, was twice that of the lower story, usually beech, with both of which natural regeneration was comparatively easy. The execution of the various cuttings was greatly facilitated by the fact that under the German administration the logging was done by the government, which, because of its direct interest in the results, was able to handle the work more effectively than private operators.—*S. T. Dana.*

GENETICS

GEORGE H. SHULL, *Editor*
JAMES P. KELLY, *Assistant Editor*

(See also in this issue Entries 2, 6, 7, 12, 18, 29, 30, 47, 48, 52, 62, 92, 94, 164, 286, 305, 316, 319, 331, 338, 339, 342, 382, 402, 452, 453)

215. ANONYMOUS. [Rev. of: BABCOCK, E. B., AND R. E. CLAUSEN. *Genetics in relation to agriculture*. 15 × 23 cm., xx + 675 p., 4 colored pl., 239 fig. McGraw-Hill Book Co.: New York, 1918 (see Bot. Absts. 1, Entry 210, 220, 244; 2, Entry 233; 3, Entry 446).] Sci. Prog. [London] 14: 169-171. 1919.

216. ANONYMOUS. *Heredity and social fitness*. [REV. of: KEY, WILHELMINE E. *Heredity and social fitness; a study of differential mating in a Pennsylvania family*. Carnegie Inst. Washington Publ. 296. 102 p., 2 folded diagrams. 1920 (see Bot. Absts. 9, Entry 239).] Nature 106: 360-361. 1920.

217. AREY, LESLIE B. On monozygotic human twins. [Abstract.] Anat. Rec. 21: 44. 1921.—Two specimens of early monozygotic human twins, each case unique of its kind, are presented. The first comprises 2 embryos, each 12.3 mm. long, contained within a single amnion and chorion; except for some shrinkage of the entire specimen, the embryos are normal. Each possesses its own umbilical cord and yolk-stalk; the latter are inserted separately on a common yolk-sac. This furnishes for the first time direct proof of the origin of human identical twins from a single ovum. The second specimen is of normal monochorionic twin embryos, each lying within its own amnion. One member of the pair (11.5 mm. in length) has a normal yolk-stalk and sac (4.5 × 6 mm.); the other individual (12 mm. long) lacks these structures completely, as gross and microscopic examination prove. Certain inferences are

suggested: (1) Human monozygotic twins do not result from the separation of blastomeres or blastomere clusters at the earliest stages of cleavage, but from a later fission of the inner cell mass. (2) Nevertheless, the human ovum appears to be rather rigid or determinate in its development; at least, in this case one embryo received all the yolk-sac formative cells. (3) The yolk-sac is not necessary for growth or differentiation; in fact the twin individual lacking a yolk-sac is slightly the larger, while the correlation of menstrual age and body size coincides with the norm. (4) The yolk-sac and stalk are not prerequisite to vasculogenesis; here was performed, as perfectly as ever may be expected, a natural experiment of ablation which demonstrates the independence of the embryo from such angioblastic ingrowths.—*Leslie B. Arey.*

218. BANTA, A. M., AND MARY GOVER. Analysis of the sexual modifications of an appendage in sex-intergrade *Daphnia longispina*. [Abstract.] *Anat. Rec.* 17: 348-349. 1920.—A detailed analysis of one of the appendages, the first leg, which is subject to wide modification in secondary sex characteristics in sex-intergrade strains of *Daphnia longispina* brings out the following facts: (1) Every detail of this appendage which is subject to sexual modification is also subject to intermediate development in sex-intergrade individuals; (2) the intermediate development of any portion of this appendage may represent any condition from a just distinguishable modification from that characteristic of the normal female to a condition approaching the normal male condition; (3) the different portions of the same individual appendage may show a range from fully female to moderately male in character, or from an intermediate condition to a fully male condition; (4) there is usually, however, a certain amount of correlation between the amount of maleness and femaleness manifest in the different portions of the same appendage, although this correlation is not sufficient to enable one to make a safe prediction from the amount of maleness manifest in one portion as to the condition of the other sexually modified portions of the same individual appendage.—*A. M. Banta and Mary Gover.*

219. BURGER, O. F. Variations in *Colletotrichum gloeosporoides*. *Jour. Agric. Res.* 20: 723-736. *Pl.* 86. 1921.—The fungus, *Colletotrichum gloeosporoides* Penz., as found in California, is a species composed of many strains. Forty-six isolations were studied and placed in 5 different groups based on mycelial growth and nature of spore production. Since characteristics of some cultures changed, a reclassification frequently became necessary. The various strains also differed in the modal length of the spores regardless of the group. The growth characteristics and size of spores varied with the media on which the strains were grown. In certain cultures the author considered that mutations arose.—*W. H. Burkholder.*

220. BURNS, W. Some aspects of plant genetics. *Proc. Seventh Indian Sci. Congress* 1920: 88-109. 1921.—Presidential address before the Botany Section of the Indian Science Congress at Nagpur, India, January, 1920. Also published in the *Agric. Jour. India* [see *Bot. Absts.* 7, Entry 868].—*Winfield Dudgeon.*

221. C., J. C. Een Botanische Puzzle. [A botanical puzzle.] *De Natuur* 41: 39-40. 4 fig. 1921.—Mr. J. K. BUDDE, the curator of the Botanical Garden of Utrecht, found a monstrosity in a pear. From its outward appearance, the fruit is composed of different divisions, following one another. The fruit had not developed seed.—*J. C. Th. Uphof.*

222. CZAJA, A. TH. [German rev. of: FLEISCHER, MAX. Über die Entwicklung der Zwergmännchen aus sexuell differenzierten Sporen bei den Laubmoosen. (Development of dwarf males from sexually differentiated spores of the mosses.) *Ber. Deutsch. Bot. Ges.* 38: 84-92. 1 pl. 1920.] *Zeitschr. Bot.* 13: 250-251. 1921.

223. DAHLGREN, K. V. OSSIAN. Nedärvning av heterostyli. [On heredity of heterostyli.] *Svensk Bot. Tidskr.* 15: 166. 1921.—Lecture given in the botanical section of the Natural Science Society of students in Uppsala, Nov. 11, 1919. In *Fagopyrum esculentum* the brevistyled form is normally homozygous, and the longistyled one heterozygous.—*K. V. Ossian Dahlgren.*

224. DAHLGREN, K. V. OSSIAN. *Pelargonium-chimär*. [A *Pelargonium chimera*.] Svensk Bot. Tidskr. 15: 171. 1921.—Lecture given in the botanical section of the Natural Science Society of Uppsala, Sept. 28, 1920. In a *Pelargonium chimera* in the botanical garden in Uppsala a shoot was found which had the green and the chlorophyll-defective parts of tissue interchanged.—K. V. Ossian Dahlgren.

225. DAHLGREN, K. V. OSSIAN. Själfsteriliteten hos *Lysimachia nummularia*. [On self-sterility of *Lysimachia nummularia*.] Svensk. Bot. Tidskr. 15: 164. 1921.—Lecture given in the botanical section of the Natural Science Society of students in Uppsala, April 29, 1911. Pollination between individuals from different countries caused fructification.—K. V. Ossian Dahlgren.

226. DANIEL, LUCIEN. Réactions antagoniques et rôle du bourrelet chez les plantes greffées. [Antagonistic reactions and the rôle of the fusion layer in vegetable grafts.] Compt. Rend. Acad. Sci. Paris 170: 1512-1515. 1920.—Every true graft leads to the formation of a fusion layer at the union of stock and scion. This layer modifies conduction and establishes an antagonism between the parts, without which the grafts would be unable to live. As a result, the stock and scion are in different biological states. An examination of grafts has shown that there may be a passage of certain substances and a retention of others at the layer, or either a passage or retention of the same reserve product. These translocations of substances, with the resulting changes in biological states, have caused many unusual variations, particularly in the mode of development of the restorative parts. Adventitious roots or branches which develop may be of the true nature of stock or scion, or may in exceptional cases form graft hybrids. Various types of behavior of these restorative growths, both of roots and branches, are described.—A. C. Fraser.

227. ERNST, A. [German rev. of: HOAR, C. S. Sterility as the result of hybridization and the condition of pollen in *Rubus*. Bot. Gaz. 62: 370-388. 3 pl. 1916.] Zeitschr. Bot. 13: 260. 1921.

228. GRIER, N. M. Notes on *Hemerocallis*, II. Torrey 21: 12-13. 1921.—The writer presents the results of a series of experiments made in 1917 on *Hemerocallis fulva*, to determine whether the plant sets seed. Four groups of experiments were conducted: (1) fertilization of the flowers with their own pollen; (2) fertilization with pollen from the same clump of day-lilies; (3) fertilization with pollen from a far-removed clump; (4) fertilization with pollen from *H. flava*. The results were in all cases negative. No mature seeds were ever found.—J. C. Nelson.

229. HARDER, R. [German rev. of: (1) SPERLICH, ADOLF. Die Fähigkeit der Linienerhaltung (phyletische Potenz), ein auf die Nachkommenschaft von Saisonspflanzen mit festem Rhythmus ungleichmässig übergehender Faktor. (Capacity to maintain lines (phyletic potency), a factor distributed irregularly to the offspring of plants with fixed seasonal rhythm.) Sitzungsber. Akad. Wiss. Wien 128: 379. 1919.—(2) IDEM. Über den Einfluss des Quellungszeitpunktes, von Treibmitteln und des Lichtes auf die Samenkeimung von *Alectorolophus hirsutus* All.; Charakterisierung der Samenruhe. (On the influence of the time of application of forcing-agents and of light on the germination of seeds of *Alectorolophus hirsutus*. Characterization of seed rest.) Sitzungsber. Akad. Wiss. Wien 128: 477. 1919.] Zeitschr. Bot. 13: 264-266. 1921.—[See also Bot. Absts. 4, Entry 3412.]

230. HECTOR, G. P. Report of the Imperial Economic Botanist. Sci. Rept. Agric. Res. Inst. Pusa 1919-20: 46-57. 1920.—Tests of varieties of wheat developed at Pusa are continued for yield, strength of straw, and rust resistance.—Wilt in *Indigofera tinctoria* (indigo) is found to be due to poor root development brought on by water-logging. New root and nodule formation begins in April, and proceeds slowly till the monsoon begins, and is then rapid. Java indigo is being improved by mass selection, as plants under bags do not produce seeds.—*Linum usitatissimum* (flax) is self-pollinated; breeding and selection are in progress. Breeding

and selection are in progress on *Nicotiana tabacum* and *N. rustica* (tobacco), *Cicer arietinum* (gram), *Hibiscus cannabinus* (patwa), *Carthamus tinctorius* (safflower), *Dioscorea* spp. (yam.), and *Oryza sativa* (rice).—Chlorosis in *Corchorus* (jute) is believed to be hereditary; "The facts tend to show that it is possibly a case of maternal inheritance, the disease being passed on through the cytoplasm of the egg-cell." A form of chlorosis common in *Cajanus indicus* (arhar) apparently behaves similarly.—A program of work for 1920-21, and a list of publications for the year are given.—*Winfield Dudgeon*.

231. HIRSCH. [German rev. of: TSCHERMAK, A. VON. Über das verschiedene Ergebnis reziproker Kreuzung von Hühnerrassen und über dessen Bedeutung für die Vererbungslehre. (Theorie der Anlagenschwächung oder Genasthenie.) (On the different results of reciprocal crossing of races of domestic fowl and on their significance for the theory of heredity. Theory of weakening of the genes or genasthenia.) Biol. Zentralbl. 37: 217-277. May, 1917.] Arch. Rassen- u. Gesellschaftsbiol. 13: 309-310. 1921.

232. HOFSTEN, NILS VON. Modern ärttighetslära. [Modern genetics.] Svenska sällskapets för Rasygien skriftserie III-IV. 14 × 22 cm., 60 p., 23 fig. P. A. Norstedts & Söners förlag: Stockholm, 1920.—A popular essay on some important results.—*K. V. Ossian Dahlgren*.

233. HOLMBERG, OTTO, R. Anteckningar till nya skandinaviska floran. [Notes to a new Scandinavian flora.]—Bot. Notiser 1920: 161-166. 1920.—Some *Equisetum* hybrids are critically discussed.—*K. V. Ossian Dahlgren*.

234. JOHANSSON, K. Was ist unter dem Namen *Ulmus montana* With. var. *nitida* Fr. zu verstehen. [What is to be understood under the name *Ulmus montana* With. var. *nitida* Fr.] Bot. Notiser 1921: 71-73. 2 fig. 1921.—A diagnosis and description of the bastard *Ulmus foliaceus* Gilib × *glabra* are given.—*K. V. Ossian Dahlgren*.

235. JOHNSON, JAMES. Inheritance of disease resistance to *Thielavia basicola*. [Abstract.] Phytopathology 11: 49. 1921.—Study of crosses between susceptible and resistant varieties have shown that inheritance of resistance, in this instance, does not follow a simple Mendelian ratio.—*B. B. Higgins*.

236. JONES, D. F. A paraffine ruler for drawing curves. Science 51: 245. 1920.—Points of desired curve are plotted on paper, placed over smooth board, and slender nails driven in at each point. Flexible strip of whalebone, metal, or bristol-board is bent around nails to fit curve, and held upright by other nails. This furnishes mould for paraffine cast of curve.—*Merle C. Coulter*.

237. JONES, SARAH V. H., AND JAMES E. ROUSE. The relation of age of dam to observed fecundity in domesticated animals. Jour. Dairy Sci. 3: 260-290. 4 fig. July, 1920.—Data are presented on beef cattle (Hereford and Aberdeen Angus) and sheep (Wisconsin Station flock) to prove that increasing the age of the dam up to a certain limit increases the occurrence of multiple births. Literature is cited to support this conclusion in other species.—The records for the Hereford and Aberdeen Angus breeds are taken from the herd books including the first 42 volumes for the Hereford and the first 26 volumes for the Aberdeen Angus. They show, aside from the major thesis, that 4.52 Hereford births per 1000 of herd-book records and 4.11 Aberdeen Angus births per 1000 of herd-book records are twins. A total of only 7 triplets and 1 quadruplet are recorded in either breed.—In sheep the multiple births per 1000 are 582.91 with 40.20 of these triplets.—*John W. Gowen*.

238. K., J. [Rev. of: STEINACH, E. Verjüngung durch experimentelle Neubelebung der alternden Pubertätsdrüse. (Rejuvenation through experimental revitalization of the senile sex glands.) 68 p., 9 pl. Julius Springer: Berlin, 1920.] Endocrinology 5: 238. 1921. [See also Bot. Absts. 9, Entry 258.]

239 KEY, WILHELMINE E. Heredity and social fitness; a study of differential mating in a Pennsylvania family. Carnegie Inst. Washington Publ. 296. 102 p., 2 folded diagrams. 1920.—Object of the investigation was twofold: "First, to determine the mode of evolution of the various lines of a great network with reference to traits which have direct bearing on social efficiency; second, to study the variation in the grade of these traits and the relation of this variation to the types of mating." The study is based on 1,822 individuals constituting 2 family networks of western Pennsylvania chiefly descended from 2 pairs of German immigrants of more than a century ago. There is given about 70 pages of detailed family history with characterizations of individuals and accompanied by 2 complete pedigree charts. Seven lines of descent or strains are made out which show diverse types of evolution, some to increased social efficiency and others to differing forms of degeneracy but each related to the type of marriage selection involved.—An attempt is made to express the distribution of certain traits in terms of Mendelian inheritance. Calculating ability is shown to behave as the expression of Mendelian dominance. "The assumption of a unit-character of varying potency, or better, of a number of determiners which behave in unit-like fashion, would appear to explain the phenomenon of inheritance for calculating ability as observed in these networks." Aggressiveness and perseverance are less satisfactorily shown to segregate in accordance with Mendel's law for presence or absence of determiners in the germ-plasm.—The several lines are compared statistically with reference to: (1) Social efficiency, showing striking divergence; (2) fecundity, which shows a noticeable drop in later generations of all lines, but no more striking in the socially efficient lines than in the degenerate lines; (3) survival increases relatively in the socially efficient lines and decreases in the degenerate lines; (4) differential migration, the more efficient migrating. Comparison of environmental opportunities with inherent tendencies seems to indicate the greater potency of the latter. [See also Bot. Absts. 9, Entry 216.]—Howard J. Banker.

240. KNIEP, H. [German rev. of: HERTWIG, OSCAR. Allgemeine Biologie. (General biology.) 5th improved and enlarged ed., 8 vo, xvi + 800 p. Gustav Fischer: Jena, 1920.] Zeitschr. Bot. 13: 173-174. 1921.

241. KOTTUR, G. L. Cross-fertilization and sterility in cotton. Agric. Jour. India 16: 52-59. 1921.—Adaptations of cotton flower to both self- and cross-pollination are described and predominance of self-fertilization noted. Vicinism amounting to 6 per cent was observed when 2 easily distinguishable strains were grown side by side at Dharwar, India. Occurrence of several manifestations of sterility, notably empty anthers and abortive ovules, was observed in naturally pollinated stocks of Indian cottons; controlled self-fertilization during 6 generations did not increase these nor the rate of boll-shedding.—T. H. Kearney.

242. KRISTOFFERSON, KARL B. Undersökning av F_1 och F_2 generationerna av en spontan bastard mellan vitkal och grönkal (mit deutschen Résumé). [Investigation of F_1 and F_2 generations of a spontaneous hybrid between white cabbage and green cabbage (with a summary in German).] Sveriges Utsädesf. Tidskr. 1921: 31-52. 8 fig. 1921.—The hybrid was very intermediate. The leaves of the parent plants had a green midrib, which, however, in white cabbage became light red in the autumn. F_1 has a dark red violet color. In F_2 a segregation into dark red violet, light red violet, and green nerves takes place according to the ratio 9:3:4. Many characters show a continuous segregation in F_2 with the qualities of the parents as extremes. As to other characters the segregation was transgressive. Chlorophyll varieties were observed. In spite of the fact that F_2 included nearly 14000 individuals no plants similar to the grandparents were obtained. Some F_2 plants resembled old seedsmen's varieties of cabbage.—K. V. Ossian Dahlgren.

243. LÉCAILLON, A. Sur les changements qu'on observe dans la reproduction et le développement des Bombyx polyvoltins de Chine lors-qu'ils sont transportés et élevés en France. [On the changes observed in the reproduction and development of polyvoltine Bombyx of China when they are raised in France.] Compt. Rend. Acad. Sci. Paris 168: 529-531. Mar., 1919.—The author observes that under the climatic conditions of France, Chinese polyvoltin silk-

worms become in course of time (30 years or so) bivoltins with a tendency to univoltinism. After bivoltinism is seemingly established certain batches of eggs showed irregularity of development producing both univoltins and bivoltins, the former being winter eggs, the latter producing a second series of eggs,—summer eggs,—namely, accidental trivoltins. The latter could be reared only by artificially raising the temperature. Hence under direct influence of climate, number of generations can be reduced or multiplied as case may be.—*Isabel McCracken*.

244. LEHMANN. [German rev. of: BATESON, W., AND IDA SUTTON. Double flowers and sex linkage in *Begonia*. Jour. Genetics 8: 199-207. Pl. 8. 1919 (see Bot. Absts. 3, Entry 208).] Zeitschr. Bot. 13: 262-263. 1921.

245. LEHMANN. [German rev. of: HERIBERT-NILSSON, NILS. Zuwachsgeschwindigkeit der Pollenschläuche und gestörte Mendelzahlen bei *Oenothera Lamarckiana*. (Rate of growth in pollen-tubes and deranged Mendelian ratios in *Oenothera Lamarckiana*.) Hereditas 1: 41-67. 1 fig. 1920 (see Bot. Absts. 6, Entry 1689; 7, Entry 1691).] Zeitschr. Bot. 13: 99-102. 1921.

246. LEHMANN, E. [German rev. of: ISHIKAWA, M. Studies on the embryo sac and fertilization in *Oenothera*. Ann. Bot. 32: 279-317. 1918 (see Bot. Absts. 1, Entries 482, 979, 980).] Zeitschr. Bot. 13: 97-99. 1921.

247. LEHMANN. [German rev. of: KANDA, M. Field and laboratory studies of *Verbena*. Bot. Gaz. 69: 54-71. 4 pl., 26 fig. 1920.] Zeitschr. Bot. 13: 262. 1921.

248. LEHMANN. [German rev. of: STOUT, A. B. Intersexes in *Plantago lanceolata*. Bot. Gaz. 68: 109-133. Pl. 12-13. 1919 (see Bot. Absts. 3, Entry 1517).] Zeitschr. Bot. 13: 261. 1921.

249. LINHART, GEORGE A. A simplified method for the statistical interpretation of experimental data. Proc. Nation. Acad. Sci. 6: 682-684. 1920.—Data now in press are cited as showing that all the types of frequency curves thus far published, excepting those having a zero class, conform to the mathematical expression

$$\frac{y}{y_0} = e^{-K^2 \left(\log \frac{m}{m_0} \right)^2}$$

when m denotes the numerical value of any measurement, m_0 the value of the mean, e the base of natural logarithms, y any frequency, and y_0 a frequency of the probability of a deviation zero. From this equation, formulae for the mean, standard deviation, etc., are derived.—*John W. Gowen*.

250. LOTKA, A. J. Evolution and irreversibility. Sci. Prog. [London] 14: 406-417. 1920.—Author's summary follows: "It has been pointed out by biologists that organic evolution is an irreversible process. Physicists also have spoken of the second law of thermodynamics broadly as the law of evolution. In inorganic physical systems irreversible processes are attended with a decrease in certain functions of the variables defining the state of the system. In the case of organic systems we have not, in general, any such definite criteria for irreversibility or for equilibrium. In the present contribution a broad formulation of evolution, organic or otherwise, is presented in analytical form. From this it is shown that, for certain cases, functions of the variables X and the parameters P defining the state of the system, and of the coefficients a defining its characteristic properties, can be indicated, which have the property, in the neighborhood of stable equilibrium, of diminishing in the (irreversible) process of the evolution of the system, and of assuming a minimum when stable equilibrium is established. In these cases, therefore, it is possible to define in exact terms the direction of evolution, whereas the descriptions ordinarily given of this direction (passage from lower to higher, from simpler to more complex forms, etc.) are vague or inaccurate."—*R. E. Clausen*.

251. LUNDBORG, H. Svenska folktyper, bildgalleri ordnat efter rasbiologiska principer och med en orienterande översikt. [Swedish types, portrait gallery arranged on race-biological principles and with a short general survey.] 23 X 51 cm., 236 p., 6 colored tables. 1920.—On pages 5–12 Swedish folk- and race-types are treated and pages 233–235 contain a chapter on "The study of Swedish folk-types, an important part of family and native-place studies." The other pages contain a portrait gallery, generally with 4 figures on each page. The material is disposed in the following groups: (1) Lapponians, (2) Norrbotten-Finns and Finnish types among the Swedish population in Sweden and in parts of Finland with Swedish inhabitants; (3) pure northern types and Swedish mixed types in Sweden, Finland, and at Runö; (4) descendants of Walloons in Sweden; (5) Swedish Jews; (6) Gypsies; (7) vagabonds, criminals and such; (8) as an appendix photos are given of a number of foreigners who have been living in Sweden for a shorter or longer time but have been punished or expelled because of vagabondage or criminality. Some of these have left descendants in Sweden.—K. V. Ossian Dahlgren.

252. MACBRIDE, E. W. The inheritance of acquired characters. Sci. Prog. [London] 15: 392–405. Jan. 1921.—An argument for Lamarckian factor in evolution, based upon a variety of considerations. There is a lack of evidence to support WEISMANN's insistence upon separation of "germ-plasm" from "soma-plasm" in ontogeny. All nuclei produced by division of egg nucleus are potentially alike; what undergoes differentiation is not nucleus but cytoplasm.—The mutations appearing in cultures of Mendelians "practically all represent deficiencies and pathological aberrations totally unlike the marks which separate natural species from one another." Experimental studies of selection in pure lines indicate that selection alone, when the environment remains constant, is powerless to effect evolution. Inheritance of effects of use and disuse appears as the only alternative.—Arguments from palaeontology and embryology are cited in favor of Lamarckian view, an example of the second being the inheritance of curvature of abdomen of hermit-crab, even if latter is prevented from finding a spiral shell. Considerable space is devoted to KAMMERER's experiments, which the author does not consider discredited by attacks of BATESON and others. Experiments of GUYER and SMITH are likewise stressed, and much significance is attached to the latter's suggestion that the degenerating eyes may themselves originate anti-bodies which in turn affect the germ-cells. If this view is accepted, says MACBRIDE, the cardinal principle of the theory of the inheritability of acquired characters is conceded.—F. B. Sumner.

253. MANN, HAROLD H. Variation in the flower of *Jasminum malabaricum* Wight. Jour. Linnean Soc. London Bot. 45: 155–158. 1920.—Author reports observations on variability of calyx and corolla and on degree of correlation between numbers of their lobes. Corolla lobes ranged from 5 to 12 with average of 7.75 lobes and coefficient of variability of 12.2 per cent. Calyx teeth ranged from 4 to 8 with average of 5.52 lobes and coefficient of variability of 3.52 per cent. No relationship was observed between calyx-lobe number and position on branch. Different plants may show different modal values. There was only a very slight tendency for number of corolla lobes to increase as number of calyx lobes increased, and *vice versa*, since coefficient of correlation was only + .1148.—James P. Kelly.

254. MARSHALL, LUCILE. Contributions of the plant breeder to the vegetable garden. Amer. Bot. 27: 8–17. 1921.—A brief account of 23 vegetables responding to the methods of plant and seed breeders in their effort to improve vegetable seeds.—S. P. Nichols.

255. MATTHAEI, R. [German rev. of: GOLDSCHMIDT, RICHARD. Mechanismus und Physiologie der Geschlechtsbestimmung. (The mechanism and physiology of sex determination.) 251 p., 113 fig. Gebrüder Bornträger: Berlin, 1920.] Zeitschr. Allg. Physiol. 19: 52–53. 1921.

256. MATTHAEI, R. [German rev. of: RUŽIČKA, VLADISLAV. Restitution und Vererbung. Experimenteller kritischer und synthetischer Beitrag zur Frage des Determinationsproblems. (Restitution and heredity. Experimental critical and synthetic contribution to the problem of determination.) Vortr. u. Aufsätze über Entwicklungsmech. Org. 23. 69 p. 1919.] Zeitschr. Allg. Physiol. 19: 48–49. 1921.

257. MATTHAEI, R. [German rev. of: STEINACH, E. Verjüngung durch experimentelle Neubelebung der alternierenden Pubertäts-Drüse. (Rejuvenation through experimental revitalization of the senile sex glands.) Arch. Entwicklungsmech. 46: 557-619. 9 pl., 7 fig. 1920.] Zeitschr. Allg. Physiol. 19: 50-52. 1921. [See also Bot. Absts. 9, Entry 238.]

258. MATTHAEI, R. [German rev. of: DÜRKEN, BERNARD. Versuche über die Erbllichkeit des in farbigem Lichte erworbenen Farbenkleides der Puppen von *Pieris brassicae*. (Studies on the inheritance of the coloration induced in the pupae of *Pieris brassicae* by colored light.) Nachrichten K. Ges. Wiss. Göttingen 1919.] Zeitschr. Allg. Physiol. 19: 49-50. 1921.

259. MILOJEVIC, BORIVOJE DIM. Sur le protoplasma génératif chez *Gregarina cuneata*. [On the generative protoplasm of *Gregarina cuneata*.] Compt. Rend. Soc. Biol. 84: 99-100. 1921.—Encysted *Gregarina cuneata* normally possess 2 nuclei, the behavior of which the author follows through the sexual cycle. Karyosomes lose their staining capacity and the nuclei increase in size. Around the nuclei is formed a hyaline and a very dense area which the author interprets as generative protoplasm. Hyaline area is formed by the fusion of the walls of cytoplasmic alveoli, the latter disappearing; this begins near wall of primary nuclei and extends outward. As the above appears the nuclei disintegrate and, in connection with the karyosome, the primary generative nucleus appears. This nucleus leaves the karyosome (the remains) and passes into the hyaline area. It is only there that it divides and gives rise by way of mitosis to all the other generative nuclei, the future nuclei of the gametes. This hyaline area, crammed with little vesicular nuclei, becomes peripheral in the cyst. The author thinks cytoplasm plays rôle in heredity because differentiated at the same time as generative nucleus.—C. L. Parmenter.

260. MOSSÉRI, V. M. Note sur la purification et l'amélioration des cotons égyptiens. [Purification and improvement of Egyptian cottons.] Bull. Agric. Algérie-Tunisie-Maroc. Ser. II, 27: 6-10. 1921.—Causes of deterioration of Egyptian cotton are discussed and a plan outlined for improvement by selection.—T. H. Kearney.

261. NILSSON-EHLE, H. Multiple allelomorphe und Komplexmutationen beim Weizen. (Untersuchungen über Speltoidmutationen beim Weizen II.) [Multiple allelomorphism and complex mutations in wheat (studies on speltoid mutations in wheat II). Hereditas 1: 277-311. 1920.—Several multiple allelomorphs in wheat are discussed. (a) Glume characters,—pubescent, half-pubescent, and glabrous. Pubescence is dominant over half-pubescence and glabrousness, and half-pubescence over glabrousness, with F_2 segregating 3:1 in each case. (b) Spike characters,—beardless, half-bearded, and bearded. The last 2 types originated from the 1st through complex mutation and linkage. Beardlessness is dominant over the other 2, and half-bearded over bearded; segregation, 3:1 in F_2 . (c) Speltoid mutations,—normal type, beardless speltoid, and bearded speltoid. This multiple allelomorphism is brought about by complex mutation, i.e., a simultaneous mutative change in several Mendelian genes, being true mutations in fact. The bearded speltoid arises through complex mutation from the normal type, but the genes in question are closely linked, and therefore the possible recombinations,—the bearded normal and beardless speltoid,—seldom appear in the progeny of heterozygotes. A dense eared sub-compactum type arises in such progeny somewhat more frequently. Compactum factor is interpreted as less closely linked to other mutated factors. At least 3 genes are assumed to mutate at the same time. The author adds a theoretical discussion of nature of complex mutations and their relationships to pleiotropy, dominant and recessive characters, presence and absence theory, and evolution.—C. E. Leighty.

262. NUTTING, C. C. The relation of Mendelism and the mutation theory to natural selection. Science 53: 129-131. 1921.—The author aims to show that modern studies of genetics have left the natural selection theory practically as it was left by Darwin. His contentions may be summarized in 2 of his sentences: "Just as Mendelism has to do with the *mechanism* and not the *fact* of heredity, so the mutation theory deals with the *nature* and not the *fact* of variations. Neither, in my opinion, has any implication that is antagonistic to the theory of natural selection."—F. B. Sumner.

263. OPPENHEIM, J. D. De erfelijkheid van het vroege of laat bloeien bij erwten. [Inheritance of early and late flowering in peas. Mededeel. Ver. Bevoord. Wetenschap. Teelt 10. 5 p. 1921.—The node at which individuals of a certain pure line start flowering is strikingly constant, though often fluctuating within 3 nodes. Other pure lines produce their first flower always at a certain node. Early-flowering varieties, such as Extra Early Pilot-pea, start at the 8th node, Sutton's Emerald Gem at 9th to 10th, Senator 10th to 11th. The later-flowering varieties such as Pois Ture, begin at the 17th to 19th and the Blue-flowering pea at the 18th to 19th node.—In crosses, the F_2 splits to early and late, the late being dominant in F_1 .—J. C. Th. Uphof.

264. PAPANICOLAOU, GEORGE N. Developmental competition in its relationship to the sex ratio. [Abstract.] Anat. Rec. 21: 76. 1921.—The average sex ratio in a stock of 3472 guinea-pigs is 103.54 when the individuals born in all litters are considered. On comparing the ratios from different-sized litters great discrepancies are found. In litters of 1 the sex ratio is 112.58; in litters of 2, 112.07; in litters of 3, 97.95; in litters of 4, 108.73; and in litters of 5, 141.02. These variations may be explained on the following principles derived from a careful analysis of the developmental conditions in guinea-pigs: 1. There is a competition between developing germ-cells and embryos in the ovary and the uterus. 2. In the competition males have some advantage over the females. 3. Competition is higher in the larger litters (by a litter is meant the number of co-developing germ-cells and embryos). 4. In litters consisting of embryos of the same sex competition is higher than in mixed litters. 5. The competition is stronger among females than among males.—In agreement with these statements there is a higher percentage of complete elimination of large litters consisting chiefly of females than of any other large litters. This elimination produces the high sex ratio for the litters of 4 and 5. The originally large litters in which the subsequent elimination is partial result in births of 1 and 2. Elimination being more severe on the female members causes the production of a higher sex ratio than occurs among individuals produced in litters of 3. Litters of 3 have the lowest sex ratio and approach nearest an expected condition, having suffered little or no prenatal mortality. This explanation is supported by a study of more than 100 litters with early partial absorptions which gave the high sex ratio of 123.37.—George N. Papanicolaou.

265. PEARSON, KARL. On the probable errors of frequency constants. Biometrika 13: 113-132. 1920.—This editorial treats of the probable errors of constants supposed to be determined by a knowledge of the ranges in which certain proportions of the frequency lie. Formulae are derived for the standard deviations and correlations of the errors in any lengths measured along the x -axis as determined by the frequency of the corresponding ranges. Correlations of errors are calculated for various combinations of median, quartile, and decile when determined from grades and from moments. These are compared to show the relative errors of each method. The best method to determine the median and quartile divisions from ranks is indicated. Similar formulae are presented for the cases where the data are grouped into broad categories.—John W. Gowen.

266. PEARSON, KARL. The fundamental problem of practical statistics. Biometrika 13: 1-16. 2 diagrams. 1920.—The fundamental problem of statistics is, "An 'event' has occurred p times out of $p + q = n$ trials, where we have no *a priori* knowledge of the frequency of the event in the total population of occurrences. What is the probability of its occurring r times in a further $r + s = m$ trials."—Prefacing his remarks with the interesting historical background, the author shows that it is sufficient to assume any continuous distribution in order to reach BAYES's theorem, the fundamental basis of statistics.—He then proceeds to expand and develop BAYES's theorem showing that the GAUSSIAN is applicable only under the special condition that n , p , q , and m are large. Under other conditions the skew frequency curves of types I or III give better results. Attention is called to the problem: Can the incomplete β function be expressed even approximately in terms of a limited number of incomplete Γ functions?—John W. Gowen.

267. PÉZARD, ALBERT. Facteur modificateur de la croissance normale et la loi de compensation. [The modifying factor of the law of normal increase and the law of compensation.] Compt. Rend. Acad. Sci. Paris 169: 997-1000. 1919.—Pullets were found by HOUSSAY and the author to experience an interruption in growth some weeks prior to commencement of laying, the growth curve dipping downward, but subsequently rising to same level as if no such interruption had occurred. Author found, in 3 individuals tested, that growth was uninterrupted if ovariectomy was performed some time before the depression of the growth curve would normally have occurred.—F. B. Sumner.

268. PLATE, L. [German rev. of: ADAMETZ, L. Studien über die Mendelsche Vererbung der wichtigsten Rassenmerkmale der Karakulschafe bei Reinzucht und Kreuzung mit Rambouillets. (Studies on the Mendelian characters of the Karakul sheep in pure breeding and in crosses with Rambouillets.) 258 p., 16 pl. Borntraeger: Berlin, 1917.] Arch. Rassen- u. Gesellschaftsbiol. 13: 306-309. 1921.

269. RAGIONIERI, A. Brassica crosses. Gard. Chron. 68: 60. 1920.—Author describes hybrids resulting from crosses between Chinese cabbage, Pe-tsai, and other Brassicas. The work was done at Castello, Italy. It is pointed out that Pe-tsai has good qualities which the plant breeder should not overlook. It grows rapidly, produces many tender leaves in large firm heads, and is of good flavor. In a number of the crosses of this with other Brassicas, no fertile seed resulted. Where good seeds were obtained, the F_1 plants showed great vigor. F_1 plants from crosses with the white turnip (*B. rapa*) were vigorous and without sign of a bulb. The tendencies to produce a bulb and an entire leaf were both recessive, and both characters appeared in F_2 in the Mendelian ratio. The bulbs in the 2nd generation showed a great variety of shapes. It was demonstrated that there is a great sexual affinity between *B. rapa* and *B. chinensis* var. Pe-tsai, and a very weak one between the latter and *B. oleracea*.—A. C. Fraser.

270. RASMUSON, HANS. Die Hauptergebnisse von einigen genetischen Versuchen mit verschiedenen Formen von Tropaeolum, Clarkia und Impatiens. [The chief results of some genetical studies with different forms of Tropaeolum, Clarkia, and Impatiens.] Hereditas 1: 270-276. 1920.—A preliminary paper without data. Dark green color of leaves in *Tropaeolum majus* is determined by 2 factors. If either is recessive, color is probably green. Green color is dominant to yellow-green and both to variegated. Variegation in flowers is dominant to self color and dark color to light. Investigations were made of the behavior of purple, dark yellow, light yellow, and yellow variegated color in *Tropaeolum*; purple, purplish-red, lachs-red, and white color in *Clarkia elegans*; purple, purplish-red, white, and purple with white edge in *Clarkia pulchella*; blue, blue-red, red, pink, white, and white variegated in *Impatiens balsamina*. In *Tropaeolum* sharp monohybrid segregation was found between *nana* and normal types, but in *Impatiens* F_2 generation shows intermediate forms.—M. Demerec.

271. RENNER, O. [German rev. of: (1) FORSAITH, C. C. Pollen sterility in relation to the geographical distribution of some Onagraceae. Bot. Gaz. 62: 466-487. 1916; and (2) COLE, R. D. Imperfection of pollen and mutability in the genus Rosa. Bot. Gaz. 63: 110-123. 1917.] Zeitschr. Bot. 13: 96-97. 1921.

272. STRAMPELLI, N. Genealogia del frumento Carlotta Strampelli. [Genealogy of the grain Carlotta Strampelli.] Atti R. Accad. Lincei. Roma Rend. Cl. Sci. Fis. Mat. e Nat. 27: 131-135. Fig. 1-4. 1918.—"Carlotta Strampelli" wheat was originated by the author by selection from the progeny of a hybrid made in 1904 or 1905 between Rieti and Massy. The work was done in connection with extensive experiments made to produce high-yielding varieties adapted to climate and soil of central and northern Italy, resistant to rust, and with tall straw yet not liable to lodge. This selection, fulfilling the requirements, was named in 1914 and exhibited in Rome. Grown 4 years since then in various provinces of northern Italy it averaged about 5.5 quintals per hectare ($8\frac{1}{2}$ bushels per acre) more than other varieties.—At least 100,000 hectares were sown in 1918. Further increase in acreage sown to the variety is anticipated.—C. E. Leighty.

273. THIEM. [German rev. of: HAECKEL, ERNST, HUGO EISIG, UND KARL HESCHELER. *Aus dem Leben und Wirken von Arnold Lang.* (From the life and activities of Arnold Lang.) G. Fischer: Jena, 1916.] *Arch. Rassen- u. Gesellschaftsbiol.* 13: 311. 1921.

274. THOMSON, J. ARTHUR. [French rev. of: DONCASTER, L. *An introduction to the study of cytology.* 15 × 23 cm., xiv + 280 p., 24 pl., 31 fig. Cambridge Univ. Press: England, 1920.] *Scientia* 29: 233-234. 1921. [See also Bot. Absts. 7, Entries 722, 723, 842.]

275. THOMSON, J. ARTHUR. [French rev. of: MORGAN, T. H. *The physical basis of heredity.* 14 × 21 cm., 300 p., 117 fig. J. B. Lippincott Co.: Philadelphia, 1919 (see Bot. Absts. 5, Entry 422; 7, Entry 938).] *Scientia* 29: 235-236. 1921.

276. VIEILLARD, P. *Note sur la sélection des riz par la constitution de lignées pures et sur les hybridations des riz.* [Note on the selection of rice by the constitution of pure lines and on the hybridization of rice.] *Bull. Agric. Inst. Sci. Saigon* 2: 11-15. 1920.—The methods of rice breeding in use at Tjikeumeuh near Buitenzorg (Java) are outlined. There are the usual pure line and hybridization methods commonly employed by those engaged in work on the self-fertilized cereals. The best of the pure lines have been increased and tested on a large scale, showing increased yield and other desirable characters. Selections from hybrids between "Skriviman Kati" and "Carolina" combine the good characters of the parents.—*C. E. Leighty.*

277. VIGIANI, D. *Sulla selezione del frumento "Gentil Rosso."* [Upon the selection of the wheat "Gentil Rosso." *Staz. Sperim. Agrarie Ital.* 52: 5-13. 1919.—Report on breeding work done at Vegni Institute (Italy) on the wheat "Gentil Rosso," which is one of the important varieties in Tuscany and other parts of northern Italy. It has been determined by tests that this variety as commonly cultivated is less rust resistant and more liable to lodge, especially on rich land, than certain other varieties, but is productive, well developed, and early-maturing. Mass selection by the author resulted in increasing the yields over the variety as ordinarily grown. By means of pure-line breeding a strain has been developed which is considered superior to Gentil Rosso; it possesses all the good characters of the latter and none of its defects.—*C. E. Leighty.*

278. VRIJBURG, B. *Fokkerij in Indië op meer wetenschappelijke basis.* [Breeding in India on a more scientific basis.] *Mededeel. Ver. Bevoord. Wetenschap. Teelt* 12. 12 p., 2 pl. 1921.—A general outline of breeding animals in Dutch East India is given.—*J. C. Th. Uphof.*

279. WALDRON, L. R. *Inheritance of rust resistance in a family derived from a cross between durum and common wheat.* *North Dakota Agric. Exp. Sta. Bull.* 147. 24 p., 2 fig. 1921.—From cross between Kubanka, an amber durum, and Power Fife, a hard red spring wheat of common type, certain plants of common type showed evidence of heterozygous condition relative to resistance toward stem rust (*Puccinia graminis*). Resistance (or susceptibility) was found to be intermediate and evidently due to more than 1 factor. Theoretical ratios based on 2-factor hypothesis agreed fairly well with actual results. Degree of resistance in certain segregates was as much or more pronounced as in resistant Kubanka parent. It is suggested that the heterozygote arose as result of simultaneous crossing over engaging 2 pairs of chromosomes. Resistant wheat has less technical value than either parent.—*L. R. Waldron.*

280. WRIGHT, SEWALL. *Correlation and causation.* *Jour. Agric. Res.* 20: 557-585. 16 fig. Jan. 3, 1921.—Formulae are derived to measure the direct influence of one variable on another assuming that the direct influence of the given variable on the other can be measured by the standard deviation remaining in the effect after all other extraneous influences are eliminated. The expression $\sigma_{A.X}$ is used for the standard deviation of X due to A. Path

coefficient for the path from A to X is defined as the ratio of the standard deviation of X due to A divided by the total standard deviation of X .

$$P_{X.A} = \frac{\sigma_{X.A}}{\sigma_X}$$

The deviation of X directly caused by a unit deviation of A is

$$P_{X.A} \frac{\sigma_X}{\sigma_A} = \frac{\sigma_{X.A}}{\sigma_A}$$

The coefficient of determination of X by A , ' $dX.A$ ' measures the fraction of complete determination for which factor A is directly responsible in a given system of factors.—These formulae are developed and illustrated for systems of independent causes, chains of causes, non-additive factors, non-linear relations, effects of common causes and systems of correlated causes. Their relation to multiple correlation is shown and general formulae are developed. Illustrative material is given on birth weight of guinea-pigs and on transpiration of plants.—

John W. Gowen.

HORTICULTURE

J. H. GOURLEY, *Editor*

H. E. KNOWLTON, *Assistant Editor*

FRUITS AND GENERAL HORTICULTURE

(See also in this issue Entries 3, 12, 15, 30, 40, 47, 48, 50, 57, 69, 76, 78, 160, 221, 242, 255, 263, 339, 415, 425, 428, 430, 432, 434, 435, 444, 445, 446, 447, 465, 498, 524, 530, 552)

281. ANONYMOUS. [Rev. of: FLETCHER, S. W. *The strawberry in North America: history, origin, botany, and breeding.* xiv + 234 p. Macmillan Co.: New York, 1917.] *Sci. Prog.* [London] 14: 350. 1919.

282. BALLOU, F. H. An orchard tragedy. *Monthly Bull. Ohio Agric. Exp. Sta.* 6: 9-11. *Fig. 1-2.* 1921.—The article contains a discussion concerning tillage-cover-crop versus grass mulch practice in a hillside orchard as based upon tests upon hilly land in southern Ohio. In spite of careful cultural work the tillage-cover-crop section was in deplorable condition at the end of the test. Orchardists are adopting the mulching method because it results in equally generous fruit production, is less expensive, less difficult, and less dangerous.—*R. C. Thomas.*

283. BALLOU, F. H. Ensee apple. An Ohio variety coming into prominence. *Monthly Bull. Ohio Agric. Exp. Sta.* 6: 12-13. 1921.—Origin, similarity to the Rome Beauty, and merits of the Ensee apple are discussed.—*R. C. Thomas.*

284. BROWN, G. G. The orchard-fertility problem. *Agric. Jour.* [British Columbia] 5: 326, 354-355; 6: 20-21. 1921.—This report summarizes the results of orchard fertilizer experiments in other stations and compares them with results obtained by the Oregon Agricultural experiment station. Special emphasis is placed upon the use of alfalfa as a permanent shade crop and the effect of chemical manures, especially nitrate, on the growth of alfalfa. It emphasises the fact that legumes used as cover crops do not need added nitrogen, but rather are harmed by it; and that the growing of a legume, with possibly the addition of some acid phosphate and potash, may prove to be a good system for maintaining orchard fertility.—*A. F. Barss.*

285. H., T. A. [Rev. of: NEWLAND, H. OSMUN. *The planting, cultivation and expression of cocoanuts, kernels, cocoa, and edible vegetable oils and seeds of commerce.* A practical handbook for planters, financiers, scientists and others. vi + 111 p., 11 pl. Charles Griffin

and Co.: London, 1919.] *Nature* 106: 564. 1920.—The author has attempted too much in a small space and has not used it to best advantage.—*O. A. Stevens.*

286. HASEMAN, L. Federal and state laws regulating the propagation and distribution of nursery stock. *Missouri Agric. Exp. Sta. Circ.* 99. 24 p. 1920.

287. MANUEL, H. L. "Yema" budding of the vine. *Agric. Gaz. New South Wales* 32: 197-199. 3 fig. 1921.—Budding is done when sap is flowing, but after period of greatest vigor of growth in order to produce a good callus. Buds are inserted 1 inch above level of soil; the bud is then covered well with soil and unmounded in spring when bud is ready to expand. An excellent callus forms during dormancy.—*L. R. Waldron.*

288. MOREL, F. Vignes de jardins et raisins de table. [Garden vines and table grapes.] *Rev. Hort.* 93: 228. 1921.—Somewhat detailed descriptions are given of a number of seedlings of cold- or disease-resistant grapes, and their general adaptability is discussed.—*E. J. Kraus.*

289. STAHL, J. H. Recent development in small fruits. *Agric. Jour.* [British Columbia] 6: 46-48. 2 fig. 1921.—An address given at the annual meeting of Western Horticulturists, Vernon, British Columbia.—*J. W. Eastham.*

290. THAYER, PAUL. Characteristics of peach varieties. *Monthly Bull. Ohio Agric. Exp. Sta.* 6: 3-8. 1921.—The relative time of picking the earlier varieties is fixed. Sixty-four varieties are discussed according to time of picking, flavor, size, color, and susceptibility to disease. Mayflower, Victor, Japan Blood Dwarf, Amsden, June Elberta, Early Rose, Greensboro, McNeil's Early, Admiral Dewey, Triumph, Waddell, Eureka, Champion, Smock, and Lemon Free are included in the list.—*R. C. Thomas.*

FLORICULTURE AND ORNAMENTAL HORTICULTURE

291. ANONYMOUS. [Rev. of: WEBSTER, A. D. *London trees: an account of the trees that succeed in London, with descriptive account of each species and notes on their comparative value and cultivation. With guide to where the finest London trees may be seen.* 8 vo, xii + 218 p., 32 pl. Swarthmore Press: London.] *Jour. Botany* 59: 79-81. 1921.

292. BARNHART, J. H. *Jeffersonia diphylla*. *Addisonia* 5: 31, 32. *Pl.* 176 (colored). 1920.—A description and the botanical history of the plant, which is native of eastern U. S. A., is given. It is worthy of a place in the flower garden.—*T. J. Fitzpatrick.*

293. BOYNTON, KENNETH R. *Diplotaxis tenuifolia*. *Addisonia* 5: 3, 4. *Pl.* 162 (colored). 1920.—The wall-rocket, of the mustard family, a native of Europe, is of possible value in a flower garden because of the pleasing combination of the pale green foliage and light yellow flowers.—*T. J. Fitzpatrick.*

294. BOYNTON, KENNETH R. *Lilium henryi*. *Addisonia* 4: 65, 66. *Pl.* 153 (colored). 1919.—This lily is a native of central China, introduced into cultivation in 1898.—*T. J. Fitzpatrick.*

295. BOYNTON, KENNETH R. *Platycodon grandiflorum*. *Addisonia* 5: 13, 14. *Pl.* 167 (colored). 1920.—The Japanese bellflower, native of eastern Asia. It was introduced into the botanic garden at Vienna in 1775 and later into England. This perennial blooms during the summer and early fall and is a satisfactory permanent feature of the flower garden.—*T. J. Fitzpatrick.*

296. BOYNTON, KENNETH R. *Poinsettia heterophylla*. *Addisonia* 4: 77, 78. *Pl.* 159 (colored). 1919.—An annual ornamental herb, native of central and western U. S. A., introduced into cultivation in about 1885.—*T. J. Fitzpatrick.*

297. BRITTON, ELIZABETH G. *Adlumia fungosa*. *Addisonia* 5: 21, 22. *Pl. 171 (colored)*. 1920.—The climbing fumitory is native of northeastern U. S. A. and Canada. It grows readily from seed and its ornamental flowers make it a valuable addition to the flower garden.—*T. J. Fitzpatrick*.

298. BRITTON, N. L. *Cephalanthus occidentalis*. *Addisonia* 5: 17, 18. *Pl. 169 (colored)*. 1920.—This button-bush is of wide distribution in North America. It prefers wet soil or swamps and is not readily transplanted except when young, and then only to places similar to its native habitat.—*T. J. Fitzpatrick*.

299. BURKILL, I. H. *Annual report of the Director of Gardens for the year 1919. 5 p.* Government Press; Singapore, 1921.—An administration report upon the Botanic Gardens, Singapore, and the Waterfall Gardens, Penang.—*I. H. Burkill*.

300. CLÉMENT, G. *Pyramides japonaises de chrysanthèmes*. [Japanese pyramidal chrysanthemums.] *Rev. Hort.* 93: 226-228. *Fig. 59*. 1921.—Methods of culture and a list of varieties best adapted to the training in this manner are given.—*E. J. Kraus*.

301. GLEASON, H. A. *Dracocephalum speciosum*. *Addisonia* 5: 27, 28. *Pl. 174 (colored)*. 1920.—An ornamental mint, native of the northern Mississippi valley. It has been in cultivation since 1825.—*T. J. Fitzpatrick*.

302. GLEASON, H. A. *Vernonia crinita*. *Addisonia* 5: 11, 12. *Pl. 166 (colored)*. 1920.—This ironweed is a native of the Ozark region of the U. S. A. It is too large and coarse for the small flower garden, but it may be naturalized to advantage in poor soils along walls, fences, in strips fronting scrub or dry woods, in open places and clearings. When established it maintains itself and does not become a pest.—*T. J. Fitzpatrick*.

303. LABROY, O. *Bougainvillea glabra* et *B. spectabilis*. *Notes du Bresil*. [Bougainvillea glabra and B. spectabilis. Notes from Brazil.] *Rev. Hort.* 93: 229-230. 1921.—Comparative descriptive notes and cultural suggestions are presented.—*E. J. Kraus*.

304. LESOURD, W. *Dahlias simples "Etoile Digoinaise"*. [Single dahlias "Etoile Digoinaise."] *Rev. Hort.* 93: 232-233. *Fig. 60-61*. 1921.—The progenitor of this race of single dahlias was discovered by a Mr. L. Martin of Dijon 16 years ago. Since that time the present type has been selected and perfected in a number of colors. The flowers are star shaped, each petal has the edges of the outer two-thirds rolled in toward the center line, and since the back of the petal is of a different color than the face the effect is striking. It is well adapted for cutting and decorative purposes. There are a number of named varieties.—*E. J. Kraus*.

305. MARON, C. *Cattleya Rutilant*. *Rev. Hort.* 93: 230. *1 pl (colored)*. 1921.—This variety, which produces intensely colored, medium sized flowers of a purple crimson color, is the result of a cross between *Cattleya Maroni* = (*C. velutina* × *C. aurea*) and *C. vigeriana* = (*C. aurea* × *C. labiata*). Of special interest is the fact that the flowers are of medium size, although three-fourths of the ancestry possessed large flowers.—*E. J. Kraus*.

306. MOUTTE, V. *La lavande*. [The lavender.] *Rev. Eaux et Forêts* 59: 11-18. 1921.—In the mountains of southeastern France lavender is a product of considerable importance to foresters. During recent years prices for essence of lavender have risen so greatly that artificial cultivation has been undertaken. Yields vary from 5 kg. of essence,—worth 150 francs per kg.,—in uncared for natural stands, to 24 kg. per hectare in highly cultivated areas. France's total estimated production in 1912 was 60,000 kg., with England as its only serious competitor. The growing and harvesting of lavender provides a considerable industry on lands otherwise unsuitable for cultivation, and it is an open question whether settlement in the mountains should not be encouraged by setting apart for this purpose certain of the better areas in the reforestation zones.—*S. T. Dana*.

307. NASH, GEORGE V. *Amygdalus davidiana*. Addisonia 5: 9, 10. Pl. 165 (colored). 1920.—This peach was discovered in 1867 by Abbé David near Peking, China, and later introduced by him into England. The ornamental flowers, appearing early, produce fruit of no value. The tree may prove of value for grafting stock.—T. J. Fitzpatrick.

308. NASH, GEORGE V. *Aphelandra nitens*. Addisonia 5: 23, 24. Pl. 172 (colored). 1920.—A highly ornamental plant of the Acanthus family, native of Columbia. It was introduced into England in 1867. It is readily propagated by cuttings and thrives under greenhouse cultivation.—T. J. Fitzpatrick.

309. NASH, GEORGE V. *Benzoin aestivale*. Addisonia 5: 15, 16. Pl. 168 (colored). 1920.—This spice-bush of the laurel family is a native of northeastern U. S. A. and Ontario. It is well adapted to the winter garden in low damp situations. The bright yellow flowers appear in early spring before the leaves and the bright red fruit in August and September.—T. J. Fitzpatrick.

310. NASH, GEORGE V. *Bryophyllum crenatum*. Addisonia 4: 63. Pl. 152 (colored). 1919.—A native of central Madagascar and a succulent of easy culture.—T. J. Fitzpatrick.

311. NASH, GEORGE V. *Bulbophyllum grandiflorum*. Addisonia 4: 71, 72. Pl. 156 (colored). 1919.—A large-flowered ornamental plant from New Guinea, recently receiving attention from culturists.—T. J. Fitzpatrick.

312. NASH, GEORGE V. *Corylopsis spicata*. Addisonia 5: 19, 20. Pl. 170 (colored). 1920.—This shrub belongs to the witch-hazel family and is a native of southern Japan. The flowers and leaves are highly ornamental. Propagation may be effected by seed or by layering.—T. J. Fitzpatrick.

313. NASH, GEORGE V. *Crataegus calpodendron*. Addisonia 4: 67, 68. Pl. 154 (colored). 1919.—This decorative pear thorn is a native of the eastern U. S. A. It is the *Crataegus tomentosa* of authors. As the red fruit persists until the following spring the plant is desirable as an ornamental shrub.—T. J. Fitzpatrick.

314. NASH, GEORGE V. *Elaeagnus multiflora*. Addisonia 4: 69, 70. Pl. 155 (colored). 1919.—A much-branched shrub, native of China and Japan, with highly ornamental flowers and fruit.—T. J. Fitzpatrick.

315. NASH, GEORGE V. *Euonymus patens*. Addisonia 4: 75. Pl. 158 (colored). 1919.—A shrub of decorative value, native of central China. It was introduced into the U. S. A. by George H. Hall in 1860.—T. J. Fitzpatrick.

316. NASH, GEORGE V. *Rosa* "Dr. Van Fleet." Addisonia 5: 7, 8. Pl. 164 (colored). 1920.—This garden hybrid was produced in 1907 by pollinating with a hybrid between *Rosa wichuraiana* and *R. safrano*. This rose is a climber with shining leaves and flesh-pink flowers, and is much admired.—T. J. Fitzpatrick.

317. NASH, GEORGE V. *Viburnum dilatatum*. Addisonia 5: 1, 2. Pl. 161 (colored). 1920.—A highly ornamental Viburnum, native of China and Japan, introduced into England about 1875, and since widely cultivated.—T. J. Fitzpatrick.

318. PROSCHOWSKY, R. Au sujet de fruits comestibles de *Chamaerops humilis* et d'autres palmiers rustiques. [Concerning edible fruits of *Chamaerops humilis* and other hardy palms.] Rev. Hort. 93: 230-231. 1921.—Several species have produced individuals having edible fruit of fair quality. These include *Chamaerops humilis* L.; *Phoenix canariensis* Hort. var *edulis*; and *Butia capitata* Beccari vars. *pulposa* and *pygmaea*. Other genera which should be examined for possible valuable selections are *Sabal*, *Erythea*, and *Brahea*.—E. J. Kraus.

319. SANDS, W. N. *Bougainvilleas*. Imp. Dept. Agric. West Indies Rept. Agric. Dept. St. Vincent 1918-19: 1-2. 1920.—The following varieties of *Bougainvillea* are under cultivation: *B. glabra* (light magenta), *B. Sanderiana* (magenta), *B. spectabilis* var. *laterita* (terra-cotta), and *B. var. "Mrs. Butt"* (crimson). Artificial crosses of these lead to the opinion "that the magenta color in the bracts is dominant over crimson and terra-cotta reds as all hybrids raised in the W. I., so far as known, in which a magenta-bracted species or variety was one of the parents, have produced magenta-coloured bracts." The period between pollination of flowers and ripening of seed is about 30 days, and the seed, which resemble grains of wheat, germinate in about 10 days in partially sterilized soil. Seedlings are rather difficult to raise.—*J. S. Dash*.

320. SMALL, JOHN K. *Hydrangea quercifolia*. *Addisonia* 5: 29, 30. *Pl. 175 (colored)*. 1920.—An ornamental shrub, native of Georgia, Florida, Alabama, and Mississippi. It has been in cultivation for over a century in the U. S. A. and England. It is hardy at least 1000 miles north of its natural habitat.—*T. J. Fitzpatrick*.

321. SMALL, JOHN K. *Leucothoe catesbaei*. *Addisonia* 4: 61, 62. *Pl. 151 (colored)*. 1919.—An evergreen shrub, native of the southern Appalachians and adjacent highlands. This dog-laurel was early introduced into European gardens and is now widely cultivated as an ornamental shrub.—*T. J. Fitzpatrick*.

322. SMALL, JOHN K. *Pieris floribunda*. *Addisonia* 5: 5, 6. *Pl. 163 (colored)*. 1920.—A mountain fetter-bush, native of the southern Alleghanies, evergreen, highly ornamental, introduced into England in 1811. This shrub is easy of cultivation, grows rapidly, and is hardy far north of its natural range.—*T. J. Fitzpatrick*.

323. WATSON, ELBA E. *Corylus rostrata*. *Addisonia* 5: 25, 26. *Pl. 173 (colored)*. 1920.—The beaked hazel-nut is a native of North America. It is of value because of the edible fruit, a small nut.—*T. J. Fitzpatrick*.

VEGETABLE CULTURE

324. KEIL, J. B. The gardener and the seedsman. *Monthly Bull. Ohio Agric. Exp. Sta.* 6: 14-15. 1921.—A few essential considerations should be kept in mind when selecting vegetable seeds. A scale for rating seedsmen is given.—*R. C. Thomas*.

325. ROSA, J. T., JR. Sweet potato culture in Missouri. *Missouri Agric. Exp. Sta. Circ.* 103. 12 p. 1921.

326. SOSA, H. A. *La mandioca*. [Cassava.] *Defensa Agric. [Uruguay]* 1: 336-338. 1920.—The culture of cassava (*Manihot* sp.) is discussed.—*John A. Stevenson*.

HORTICULTURE PRODUCTS

327. MACH, F., UND M. FISCHLER. Die Zusammensetzung der Moste des Jahres 1919 in Baden. [Musts of 1919 in Baden.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 40: 72-77. 1920.

328. MARCAILHOU D'AYMERIC, A. Analyse d'un vin de palmier ou "laghmi" du Sud-Tunisien. [Analysis of a palm-wine or "laghmi" of southern Tunis.] *Jour. Pharm. et Chimie* 23: 272-273. 1921.—The wine has a sp. gr. of 1.0295 and contains 2 per cent of glycerin, 3 of gum, 7 of mineral matter, and, after allowing it to stand for about 1 week, 4.5 per cent of alcohol by weight. The wine is obtained by puncturing the palms of the oasis Gabès. It flows at the rate of 7-8 l. per day for 1 month. The puncture is closed with vegetable matter or dirt and the tree regains its normal appearance after 1 year. The wine is consumed by the natives very frequently immediately after collecting, even before fermentation has started.—*H. Engelhardt*.

329. SCHELLBACH, H., UND FR. BODINUS. Über Vanillin-Erzeugnisse. [Vanilla products.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 34-37. 1920.

330. STERN, J. Moste des Jahres 1919 aus den Weinbaugebieten der Nahe, des Glau, des Rheintales unterhalb des Rheingau, des Rheingau, des Rheins, Mains und der Lahn. [Musts of 1919 in the Rhine valley, etc.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 78-80. 1920.

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 62, 175, 226, 380, 405, 453)

331. BALASUBRAMANYAM, M. Variegation in certain cultivated plants. Jour. Indian Bot. 1: 325-329. Pl. 3. 1920.—From an examination of leaf structure of cultivated ornamental plants with variegated leaves, the author concludes that there are 3 kinds of mesophyll in the leaf—palisade above, spongy below, and a distinct type between. Variegations are due to varying amounts or complete absence of chlorophyll in these 3 layers.—Winfield Dudgeon.

332. BUCHHOLZ, JOHN T. Polyembryony among Abietineae. Bot. Gaz. 69: 153-167. 15 fig. 1920.—Not all Abietineae show a complete separation of the 4 primary embryos, as is characteristic of *Pinus*. The cleavages separating the 8 embryos are the free nuclear divisions of the proembryo. In *Picea* and other forms without cleavage polyembryony, cell divisions homologous with those in *Pinus* occur in the proembryo. The Abietineae embryos may be arranged in an intergrading series, with *Pinus* at one end and *Pseudotsuga* at the other, on the basis of the occurrence of cleavage polyembryony, rosette embryos, and the apical cell; the rosette embryos and their vestiges, the rosette cells, are gradually eliminated from *Pinus* to *Pseudotsuga*. Cleavage polyembryony, rosette embryos, and the apical cell mark a primitive type of embryo development. The embryo development of this group shows how the apical cell was lost in the evolution of the Abietineae. On the basis of embryogeny *Pseudotsuga* is unique and clearly entitled to generic rank.—H. C. Cowles.

333. BUGNON, P. Causes du parcours transversal des faisceaux libéro-ligneux aux noeuds des Graminées. [The cause of the transverse course of the fibrovascular bundles at the nodes of grasses.] Compt. Rend. Acad. Sci. Paris 171: 673-675. Fig. 1-3. 1920.—A continuation of a study reported in a recent number of this journal (see Bot. Absts. 7, Entry 1060). The change in direction of the bundles at the nodes is attributed to lack of space or necessary tissue, and to the readiness with which transverse bundles can be formed at this level.—C. H. Farr.

334. BUSCALIONI, L. Sui tricomi delle Felci con particolare riguardo alle Parafisi. [On the trichomes of ferns with particular regard to the paraphyses.] Malpighia 28: 545-554. 1920.—The article completes a study of the structure and function of fern paraphyses. The peculiar structure of these organs in different species of ferns suggests their use as a basis for comparison in systematic study. Paraphyses function as a means of protection to the sporangia, either mechanically or by reason of substances contained in them, and possibly serve also in regulating the dissemination of spores.—Edith K. Cash.

335. CHURCH, A. H. Elementary notes on the reproduction of angiosperms. Bot. Mem. [Oxford] 5. 23 p. 1919.—These are notes apparently used by the author in connection with some of his courses in botany.—J. S. Cooley.

336. CHURCH, A. H. Elementary notes on structural botany. Bot. Mem. [Oxford] 4. 27 p. 1919.—These are notes used by the author in connection with some of his courses in botany.—J. S. Cooley.

337. CHURCH, A. H. On the interpretation of phenomena of phyllotaxis. Bot. Mem. [Oxford] 6. 58 p. 1920.—FIBONACCI phyllotaxis, as a phase of plant symmetry, is reduced to a condition of centric, axial growth-extension, combined with the outthrust in rhythmic sequence of somatic protrusions in the transverse plane. To maintain the older inherent centric organization, the Fibonacci angle, $137^{\circ} 30' 28''$, must be approximated every time, though the range of error may be considerable in the individual units. Actual measurements show that the general plan keeps very fairly adjusted in such divergent types as *Quinqueloculina*, *Cystoseira*, *Polytrichum*, and *Sempervivum*. Taking the general progression of Fibonacci phyllotaxis as the expression of an archaic method of initiating one lateral extension of the soma at a time, from a growth center or a differentiated growing point, the more fundamental and primary relations of living plasma, established once and for all, even in the plankton-phase, may remain predominant throughout all future phases of progression. All primary problems of stem and root, leaf and branch, members and tissues, cells and space-form, are to be sought far behind the comparatively modern and wholly secondary subaerial environment in which we find ourselves in the more familiar vegetation of the land.—F. V. Rand.

338. MERRIMAN, MABEL L. The receptacle of *Achillea millefolium* L. Torreyia 21: 21-24. Fig. 1-5. 1921.—The receptacle of *Achillea* is usually described as flat or convex, but specimens from the vicinity of New York City examined in October, 1919, showed a conical or oblong head. Further study in 1920 showed that while heads with flat receptacles bore an average of 12 flowers per head, the conical heads had from 23 to 27. The projection of the tubular beyond the ray-flowers, which is less than 1 mm. in the flat heads, was as much as 11 mm. in the conical forms. In some cases ray-flowers were interspersed with the tubular flowers on the elongated receptacle. Further experiments are suggested to determine whether in these elongated receptacles we have mutating characters or reversions. It is suggested that soil-content and seasonal conditions may have some influence.—J. C. Nelson.

339. PRAYAG, S. H. Some observations on the inflorescence and flowers of the grape. Agric. Jour. India 16: 60-64. Pl. 8-9. 1921.

340. ST. JOHN, HAROLD. A freak sweet clover. Rhodora 23: 25-26. 1921.—A description of a teratological specimen of *Melilotus alba* from Goldendale, Washington, characterized by an inflorescence with branching pedicels, which thus formed a panicle instead of the usual simple spike. In addition the pistil was foliaceous with 2 or 3 ovules borne on each of the slightly adnate edges.—James P. Poole.

341. VUILLEMIN, PAUL. Les aberrations de la symétrie florale. [Various types of floral symmetry.] Compt. Rend. Acad. Sci. Paris 172: 35-39. 1921.—The author distinguishes 3 main types of floral form: Asymmetric, spiromorphic, and symmetric. The last named may be either actinomorphic or zygomorphic. *Actinomorphosis* refers to the substitution of the actinomorphic for the zygomorphic or the asymmetric; and *zygomorphosis* to the substitution of the zygomorphic for the actinomorphic or the asymmetric. Actinomorphosis is equivalent to some of the cases which have been called peloric, but not to all. The condition of zygomorphosis has not in the past been much studied. These types may vary in the plane of symmetry and in the configuration, position, or number of the floral parts. They may be exogenous or endogenous, the latter presenting either synanthly or paranthly. The paper includes a description of these types as they are found in *Tropaeolum majus*.—C. H. Farr.

342. WEATHERWAX, PAUL. Position of scutellum and homology of coleoptile in maize. Bot. Gaz. 69: 179-182. 11 fig. 1920.—The evidences derived from the structure and development of the maize embryo, including that of the ligule-less mutant, favor the idea that the coleoptile is the homologue of a foliage leaf, and that the cotyledon is a lateral organ.—Paul Weatherwax.

343. WISSELINGH, C. VAN. Bijdragen tot de kennis van de zaadhuid. Tiende bijdrage. Over de zaadhuid van *Reseda luteola* L., *Parnassia palustris* L., *Viola odorata* L., *Daphne mezereum* L., *Eleagnus edulis* Siebold, *Aucuba japonica* Thunb. en *Pirola rotundifolia* L. [Contributions to a knowledge of the seed coat. Tenth contribution.] Pharm. Weekbl. 58: 298-308, 326-342. Pl. 2, fig. 22. 1921.—In continuation of the author's previous studies [see Bot. Absts. 3, Entries 2453, 2809; 8, Entries 444, 445], the ovules of the above species are described, particular attention being paid to the structure and development of the integuments in the ovule and to the changes which they undergo as the ovule ripens into the seed. Cuticles and cork layers are especially studied.—H. Engelhardt.

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

(See in this issue Entry 373)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

344. CHURCH, A. H. Thallassiophyta and the subaerial transmigration. Bot. Mem. [Oxford] 3. 95 p. 1919.—See Bot. Absts. 7, Entry 2007.

345. DISMIER, G. Notes sur les *Fissidens serrulatus* Brid. et *Fissidens polyphyllus* Wils [Notes on *Fissidens serrulatus* and *F. polyphyllus*.] Rev. Bryologique 47: 54-56. 1920.—The geographical distribution and differential characters of *Fissidens serrulatus* and *F. polyphyllus* are discussed, emphasis being laid on certain anatomical features first pointed out by BOTTINI. So far as France is concerned the distribution of *F. serrulatus* is essentially Mediterranean, while that of *F. polyphyllus* is exclusively oceanic.—A. W. Evans.

346. HERZOG, TH. Beiträge zur Bryogeographie Südosteuropas. [Contributions to the bryogeography of southeastern Europe.] Krypt. Forsch. Bayer. Bot. Ges. München 4: 274-298. 1919.—The author participated with a German unit in military operations in the Balkans during the late war. As opportunity offered he made bryological observations and collections. The paper is divided into 2 parts, of which the 1st deals with Macedonia and the 2nd with the Transylvanian Alps of the Rumanian border. Lists of mosses and hepatics are given, together with a discussion of points of geographical and ecological interest. The Macedonian flora is primarily Mediterranean, that of the Rumanian mountains northern. As new species (both from the Cherna bend region of Macedonia) appear *Orthotrichum insidiosum* and *Mielichhoferia paradoxa*, the latter supposedly a relict of an ancient tropical or subtropical flora.—A. LeRoy Andrews.

347. POTIER DE LA VARDE, R. Contribution à la flore bryologique du Kikouyou (Afrique orientale anglaise). [Contribution to the bryological flora of Kikuyu (British East Africa).] Rev. Bryologique 47: 49-54. 6 fig. 1920.—This report is based on a collection made by J. SOUL in the vicinity of Nairobi, during the years 1912 and 1913. The species listed number 29, full data regarding localities being given under each. The following species are described as new and figured: *Anomobryum sulcatum* Thér. & P. de la V., *Bryum Souliei* Thér. & P. de la V., *Hylophila acuminata* Broth. & P. de la V., *Philonotis Souliei* P. de la V., and *Tortella Therioti* Broth. & P. de la V. Two new varieties are likewise described and the capsule of *Lindbergia patentifolia* Dixon, hitherto unknown, is figured.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA,
AND MYXOMYCETESH. M. FITZPATRICK, *Editor*

FUNGI

(See also in this issue Entries 151, 219, 492, 515, and those in the section Pathology)

348. ANONYMOUS. Auskunft über Speisepilze. [Information concerning edible fungi.] Naturwiss. Zeitschr. Forst- u. Landw. 18: 278-279. 1920.—*Agaricus melleus*, well known in Germany as a serious enemy of soft woods, is described with reference to its life-history, morphology, edibility, etc. The edible qualities and food possibilities of the species are emphasized; a recipe for cooking is given.—J. Roeser.

349. CHIPP, T. F. A list of the fungi of the Malay Peninsula. Gardens Bull. Straits Settlements 2: 311-418. 1920.—A complete list of the known fungi of the Peninsula with localities and hosts.—I. H. Burkill.

350. CHURCH, A. H. Elementary notes on the morphology of fungi. Bot. Mem. [Oxford] 7. 29 p. 1920.—These are notes apparently used by the author in connection with some of his courses in botany.—J. S. Cooley.

351. CLAYLEY, DOROTHY M. Some observations on the life-history of *Nectria galligena* Bres. Ann. Botany 35: 79-92. Pl. 4, 5., fig. 1-25. 1921.—A study of the morphology and cultural characters of a fungus isolated from an apple canker in Britain. The writer agrees with WEESE that the *Nectria* which has been shown to form definite cankers on beech and other trees, and which has been discussed in literature under the name *Nectria ditissima* Tul., should be called *N. galligena* Bres. This fungus grew well and completed its life-history on a starch medium containing 1 per cent glycerine. All stages of the fungus,—microspores, macrospores, and perithecia,—develop normally on potato slants with 1 per cent glycerine, the latter being the only medium found on which the fungus developed perithecia. Pycnidia were found on bark but no mature pycnidia were seen in pure culture on artificial media. There is thus insufficient proof that pycnidia occur in the life-history of *N. galligena*.—Several ascogonia occur in the young perithecium; these degenerate and disappear before the formation of the asci. The ascogenous hyphae, from which the asci develop, arise *de novo* from cells at the base of the perithecium, the nuclei of which have the same characteristics as the nuclei of the ascogonia. The further development of the perithecium could not be followed.—W. P. Fraser.

352. GARRETT, A. O. Smuts and rusts of Utah — IV. Mycologia 13: 101-110. 1921.—The paper includes discussions of 5 smuts and 45 rusts. *Hilaria Jamesii* is reported as a new host for *Ustilago Hypodytes* (Schlecht.) Fries, and *Lepidium perfoliatum* and cultivated *Tropaneolium* as new hosts for *Puccinia subnitens* Dietel.—H. R. Rosen.

353. GLOYER, W. O. Septoria leaf blight on the China aster. [Abstract.] Phytopathology 11: 50-51. 1921.—A new disease of China aster (*Callistephus chinensis*) has been under observation in New York State since 1915. The leaves are spotted and finally killed by *Septoria Callistephi* n. sp.—B. B. Higgins.

354. GROVE, W. B. Mycological notes.—V. Jour. Botany 59: 13-17. 1921.—The new combination *Boydia insculpta* (Oud.) Grove is made, it being shown that several species supposed by various authors to be distinct are really forms of the same species. A collection of undoubted *Puccinia Peucedani-parisiensis* (DC.) Lindr. from Britain is discussed. Notes are included on some fresh collections of *Phomopsis abietina* Grove. [See also Bot. Absts. 8, Entry 1294.]—K. M. Wiegand.

355. GUIART, J. Considerations sur le mycetome, a propos d'un cas nouveau. [Considerations upon mycetomes with reference to a new case.] Compt. Rend. Soc. Biol. Paris 83: 277-278. 1920.—In a mycetome with white grains of the *Aspergillus* type a thin pigment layer was found which leads the author to conclude that this is a step in the transition from the white-grained to dark-grained type, and that accordingly the genera *Indiella* and *Madurella* are the same fungus in respectively the white-grain and dark-grain stage of development of the mycetome.—E. A. Bessey.

356. HORNE, ARTHUR S. Diagnoses of fungi from spotted apples. Jour. Botany 58: 238-242. 1920.—The new genus *Polyopeus* is described, and a synopsis of the 4 species included is given. The genus is referred to the *Hyphomycetes*. The following new species and varieties are given: *Pleospora pomorum*, *Fuckelia botryoidea*, *Coniothyrium cydoniae* Brun. var. *mali*, *C. convolutum*, *Alternaria pomicola*, and *Sclerotium stellatum*.—K. M. Wiegand.

357. MURRILL, W. A. A new bolete from Porto Rico. Mycologia 13: 60-61. 1921.—A species with pale, ellipsoidal spores is described as *Gyroporus Earlei* sp. nov.—H. R. Rosen.

358. MURRILL, W. A. Light-colored resupinate polypores — III. Mycologia 13: 83-100. 1921.—A continuation of studies previously reported (see Bot. Absts. 8, Entry 466). In this paper rose-colored, lilac, red and purple species of *Poria* are described. Among the 26 species treated, the following are new: *Poria albirosea*, *P. subundata*, *P. subincarnata* (Peck), *P. Dodgei*, *P. Bracei*, and *P. subbadia*.—H. R. Rosen.

359. MURRILL, W. A. Two species of *Fuscoporia*. Mycologia 13: 119. 1921.—Two new combinations are made based on dark-colored species previously included in *Poria*. They are *Fuscoporia tenerrima* (Berk. & Rav.), and *F. nebulosa* (Berk. & Curt.).—H. R. Rosen.

360. MURRILL, W. A. A double mushroom. Mycologia 13: 119-122. Fig. 1-3. 1921.—A peculiar carpophore of *Agaricus campestris* is described in which there are 2 sets of gills as well as 2 stems. An appearance is given such as would exist if the caps of 2 mushrooms occurring side by side had entirely grown together and the stronger mushroom had lifted the other into the air. Comparable abnormalities in other gill-fungi are noted.—H. R. Rosen.

361. MURRILL, W. A. The genus *Tinctoporia*. Mycologia 13: 122-123. 1921.—Three new combinations are made and the forms described. *Tinctoporia aurantiotingens* (Ellis & Macbr.) Murrill becomes *T. albocincta* (Cooke & Masse) comb. nov. on the basis of priority; the other new combinations are *T. graphica* (Bres.) based on *Poria graphica*, and *T. Fuligo* (Berk. & Br.), based on *Polyporus (Poria) Fuligo*.—H. R. Rosen.

362. PENNELL, FRANCIS W. Index to American mycological literature. Mycologia 13: 126-128. 1921.

363. PUTTEMANS, A. *Gloeosporium Bombacis*, n. sp. Bull. Soc. Path. Veg. France 7: 74-75. 1920.—The above fungus found on *Bomax (Pachyra) insignis* in the vicinity of Sao Paulo, Brazil, is described and its effect upon the host indicated. Bordeaux mixture is suggested as a control measure.—C. L. Shear.

364. REINKING, OTTO A. Higher Basidiomycetes from the Philippines and their hosts I. Philippine Jour. Sci. 15: 479-490. 1919. [See also the 3 following entries.]

365. REINKING, OTTO A. Higher Basidiomycetes from the Philippines and their hosts II. Philippine Jour. Sci. 16: 167-179. 1920.—Identification of the higher Basidiomycetes collected on Mount Maquiling and in the vicinity of Los Baños, Laguana Province, Luzon, in Mindanao, and in Sulu, with special reference to the host plants. [See also the preceding entry and the 2 following ones.]—Albert. R. Sweetser.

366. REINKING, OTTO A. Higher Basidiomycetes from the Philippines and their hosts III. Philippine Jour. Sci. 16: 527-537. 1920. [See also the following entry and the 2 preceding ones.]

367. REINKING, OTTO A. Higher Basidiomycetes from the Philippines and their hosts IV. Philippine Jour. Sci. 17: 363-374. 1920. [See also the 3 preceding entries.]

368. SEAVER, FRED J. Photographs and descriptions of cup-fungi—IX. North American species of *Discina*. Mycologia 13: 67-71. Pl. 4. 1921.—The genus *Discina* is described and is interpreted as including large cup-fungi which have appendiculate spores. Four species are recognized and described, including *D. apiculata* (Cooke) Seaver, comb. nov., and *D. convoluta* Seaver, sp. nov.—H. R. Rosen.

369. SPEARE, A. T. *Massospora cicadina* Peck—a fungus parasite of the periodical cicada. Mycologia 13: 72-82. Pl. 5-6. 1921.—An extensive mycological study of the fungus, including both the conidial and resting spore stages. It is shown to belong to the Entomophthorales.—H. R. Rosen.

370. STONE, R. E. Leaf scorch or mollisiose of strawberry. [Abstract.] Phytopathology 11: 44. 1921.—A leaf disease of strawberries, serious in certain parts of Ontario, Canada, is due to *Marssonina Potentillae*. This fungus has been proved to be the conidial stage of *Mollisia Earliana* (E. & E.) Sacc.—B. B. Higgins.

371. WEISS, HARRY B., AND ERDMAN WEST. Additional fungous insects and their hosts. Proc. Biol. Soc. Washington [D. C.] 34: 59-62. 1921.—A list of insects found on various fungi is given.—J. C. Gilman.

372. WORMALD, H. On the occurrence in Britain of the ascigerous stage of a "brown-rot" fungus. Ann. Botany 35: 125-135. Pl. 6-7, fig. 1-9. 1921.—The author describes a *Sclerotinia* found on mummified plums. Cultures from single ascospores gave conidia of the *Monilia cinerea* type. The spores agreed in size with those produced in culture from conidia taken from plums naturally infected with *M. cinerea*. Inoculations on plum flowers and fruit and cherry fruit with conidia obtained from cultures gave infection, while inoculations on apple flowers were not followed by invasion of the flowering spurs. Inoculations with a strain of *Monilia* isolated from a dead flowering spur of apple gave ready invasion of the flowering axis. The fungus is referred to *Sclerotinia cinerea* (Bon.) Schröter. The author also compares the brown-rot *Sclerotinias* and concludes that the *Monilia* strain obtained from North America is very similar to the gray *Monilia* common in Britain, but differs from the latter in its mode of growth in culture. Strains of *Monilia* from plum obtained in France and Holland proved similar in form to those in Britain. The American *Sclerotinia* appears, therefore, to be a distinct species, or at least a form culturally distinct from the European *Monilia cinerea* Bon. The *Sclerotinias* occurring on apricots and cherries in Europe show no essential morphological differences. Further study is needed to determine whether they are culturally or biologically distinct.—W. P. Fraser.

LICHENS

373. CHURCH, A. H. The lichen as transigrant. Jour. Botany 59: 7-13, 40-46. 1921.—In a previous paper (see Bot. Absts. 8, Entry 477) the author has suggested that lichens, or at least the fungous part, have arisen from algal ancestors. In the present paper it is pointed out that the intrusion of algal gonidia is not an unusual phenomenon, as the intrusion of photosynthetic as well as non-photosynthetic bodies occurs in a great many aquatic animals and plants. Many examples are given. It is the fungus which must be considered in phylogeny. Instead of flagellated zooids, the ancestors of the Ascomycetes probably had an open hymenium with asci discharging their spores by hydrostatic tension; the perithecium is more recent. Numerous small ascocarps, as in most lichens, is a more primitive condition than

a single large cup, as in *Peziza*. It is among the lichen-forming Ascomycetes that the most prominent suggestion of vestigial sexual organs occurs. Though curiously parallel, the Florideae and the lichens have no direct connection. The higher algae present a firm cortical layer resistant to intrusion and therefore the gonidia of lichens did not intrude during life in the open sea but probably in pools. It may be suggested that fungal hyphae represent the internal heterotropic portion of a seaweed with the cortical photosynthetic layers lost because of lack of oxygen. The complex soma of higher fungi simply represents the "skinned" soma of a complex alga, hence the striking similarities in reproduction. The algae of the lichen gonidia have penetrated later into the denuded algal soma; in this connection the attachment of unicellular algae to denuded seaweeds in pools is noted. The lack of sufficient oxygen for respiration at night in pools probably led to the death of the cortical layer, and probably to migration to subaerial ("splash") habitats. The first stage of migration to the land is shown by seaweeds living above the surface, but within the region of "splash." Lack of nitrogen and water keep the lichen thallus small after emergence. Resistance to drought is not characteristic of lichens, occurring also in some algae and fungi. Lichens are probably the oldest surviving race of land plants. It remains to show the course of evolution in the reproductive processes. The lichens and fungi are evidently polyphyletic.—K. M. Wiegand.

PALEOBOTANY AND EVOLUTIONARY HISTORY

E. W. BERRY, *Editor*

(See also in this issue Entries 332, 339, 373, 512)

374. ARBER, AGNES. Water plants: a study of aquatic angiosperms. xvi + 436 p., 171 fig. Cambridge Univ. Press. 31s. 6d. 1920.—The book contains much of interest from the standpoint of phylogeny and evolution. [See also Bot. Absts. 9, Entry 380.]—E. W. Berry.

375. BERRY, EDWARD W. A Potamogeton from the Upper Cretaceous. Amer. Jour. Sci. 1: 420-423. Fig. 1-3. 1921.—A very characteristic Potamogeton, *P. perryi*, is described from the Ripley formation, late Upper Cretaceous, of western Tennessee.—E. W. Berry.

376. CARPENTIER, ALFRED. Découverte du genre *Plinthiotheca* Zeiller dans le Westphalien du nord de la France. [Discovery of the genus *Plinthiotheca* Zeiller in the Westphalian of northern France.] Compt. Rend. Acad. Sci. Paris 172: 814-815. 1921.—This form, described originally from Heraclée, Asia Minor, is recorded from Pas-de-Calais. It is interpreted as a microsporophyll, elliptical in form and about 11 × 21 mm, in size, with one surface covered with microsporangia. It is considered to represent the microsporophyll of either *Linopteris obliqua* or *Neuropteris gigantea*.—E. W. Berry.

377. CHUDEAU, R., ET P. H. FRITEL. Quelques bois silicifiés du Sahara. [Several silicified woods from the Sahara.] Bull. Soc. Géol. France 20: 202-207. Fig. 1. 1920.—The general occurrence and varied age of sandstones with silicified wood throughout northern Africa are discussed. Three specimens of wood from the Sahara sandstone are described which are referred to the recently proposed form genus *Mesembryoxylon* Seward, and are considered as probably of Cretaceous age.—E. W. Berry.

378. COLEMAN, A. P. Paleobotany and the earth's early history. Amer. Jour. Sci. 1: 315-319. 1921.—A criticism, from the standpoint of physical geology, of Knowlton's thesis of uniform geologic climates under the influence of terrestrial heat.—E. W. Berry.

379. DEPAPE, G. Sur la présence du *Juglans cinerea* L. fossile Bronn dans la flore pliocène de Saint-Marcel-d'Ardèche. [On the presence of *Juglans cinerea* L. in the Pliocene of Saint-Marcel-d'Ardèche.] Compt. Rend. Acad. Sci. Paris 171: 865-866. 1920.

380. GUPPY, H. B. Evolution of water plants. [Rev. of: ARBER, AGNES. *Water plants: a study of aquatic angiosperms.* xvi + 436 p. University Press: Cambridge, 1920 (see Bot. Absts. 9, Entry 374).] *Nature* 106: 462-463. 1920.

381. FRITEL, P. H. Sur l'existence de l'Oeillette (*Papaver somniferum* var *nigrum* DC.) en Provence, a l'époque quaternaire. [On the existence of the poppy in the Pleistocene of Provence.] *Bull. Soc. Géol. France* 20: 207-208. *Fig. 1.* 1920.—A well preserved capsule of a poppy from Aygalades, Bouches-du-Rhone, contained in a tuff of middle Pleistocene age is described and figured.—*E. W. Berry.*

382. JANET, CHAS. Considerations sur l'être vivant. Première partis. Résumé préliminaire de la constitution de l'orthobionte. [Considerations on the living being. Part one, Preliminary résumé of the organization of the orthobiont.] 80 p., 1 pl. Beauvais. 1920.—Study of ontogeny shows that all life springs from a single initial form—a phyto-zoo-flagellate, extra-terrestrial in origin. Primordial assemblages of cells are called "merismes." Cells are of two kinds,—plano-plastids (flagellated) and aplano-plastids (non-flagellated), one form leading to the other. The primitive cell is eventually imperishable. A merisme consisting of a sporadic swarm with its derivative, the filament (of *Ulothrix*), and to transformations of that filament, is given the name "plethea." The first cell is a proplastid; cells in process of division are ontoplastids; products of division forming the merisme are teleplastids. Teleplastids are eventually imperishable (gonidia) and are apt to develop into new merismes. Plano-plastids of the plethea may develop into a new merisme, the blastea, a spherical sheet formed of a single layer of cells. The type of this process is furnished by the ontogeny of the blastea of *Volvox*, stages of which are seen in the development of Algae, Bryophyta, Pteridophyta, and Anthophyta. The blastea of the phyto-zoo-flagellate may be considered as being represented by the blasteas of the phyto-flagellates, the Chlorophyceae, and the zoo-flagellates. Its proplastid is a planoplastid transformed by conditions into an aplanoplastid. There is a pletheoblastean alternation in the primitive living form: (1) Alternation of plethea and blastea, resulting in plano-spores; (2) intercalary alternations of plethea and blastea, resulting in plano-spores; (3) male and female gametes; (4) parthenogenesis where there is failure of conjugation. Development that has its birth with the zygote disappears with the death of its merismes or terminates in a new zygote constituting a "holobiont." A line of merismes leading directly from an initial zygote to a first new zygote is an "orthobiont," which may be simple or double (with parthenogenetic alternation). The orthobiont is the essential element of phyletic lines. Phyto-flagellates and zoo-flagellates considered without regard to the divergences of the phyla differ merely in the mode of nutrition. The Volvocaceae are purely blastean chlorophytes in which occurs the differentiation into vegetative and sexual cells. In the unbranched Chlorophyceae, *Ulothrix* (a purely gonidial form) is directly derived from a chlorophyllian phyto-flagellate. The Chlorophyceae are pletheoblastean in nature. Departing from *Ulothrix* a differentiation of this state leads by way of the branched Chlorophyceae to the proto-archegoniate ancestor of the primitive eu-archegoniate, whence are directly derived the related groups, Bryophyta and Pteridophyta. The gymnosperms, or astigmates, are derived from a heterosporous pteridophyte of the extinct group of Cycadofilices. The angiosperms, or stigmates, are derived either from a pteridophyte of the Cycadofilices group related to that from which the gymnosperms originated, or from a primitive gymnosperm.—The primitive animal, the zoo-flagellate, or protozoan, is an orthobiont, simple or exceptionally double (parthenogenesis). The somatic animal, or metazoan, is derived from an ancestral zoo-flagellate with a simple orthobiont. The orthobiont of the insect, which is taken as a type, comprises an initial blastea plus alternation of plethea and blastea, plus blastea. The zygote develops into a blastea which in the very beginning differentiates into (1) soma and (2) a gonidium of the orthobiontic value of a spore. The germ is the product and direct descendant of the spore or primordial germinal cell which constitutes the single and precocious gonidium of the initial blastea.—*Winifred Goldring.*

383. REYNOLDS, S. H. The lithological succession of the carboniferous limestone (Avonian) in the Avon Section at Clifton, Bristol. [Abstract.] *Ann. and Mag. Nat. Hist.* 7: 255-256. 1921.—Among other things regarding the rocks of the Avon Section the author says that the 3 Modiola phases (calcareous-lagoon phases) of Kn, C₂-S₂, and the top of S₂ recognized by Dixon in Gower, are represented in the Avon Section, and that with them are constantly associated calcareous algae. The upper S₂ Zone is largely algal in origin, the Cotham-Marble-like layers consisting of *Mitcheldeania* or *Spongostroma*. The former is the most persistent calcareous alga, ranging from the base of the section to the top of S₂. *Ortonella* is characteristic of the K beds. *Solenopora* is also found here. *Spongostroma* is the prevalent organism in many of the calcite-mudstones of C₂ and S. *Girvanella* is found in D₁, and *Aphralysia* in C₂ and S. The "Seminula-pisolite" structure of Vaughan proves to be of algal origin. [From author's abstract of a paper read at the meeting of the Geological Society.]—*H. H. Clum.*

384. SCHUCHERT, C. Evolution of geologic climates. *Amer. Jour. Sci.* 1: 320-324. 1921.—Knowlton's conclusions that climate in the past was uniform and mild is criticized, and it is concluded that "throughout its history the earth has had temperature zones, varying from an intensity as marked as that of today to almost complete absence, so that the greater part of the earth had an almost uniformly mild climate, without winter."—*E. W. Berry.*

385. STEVENS, NEIL E. Two petrified palms from interior North America. *Amer. Jour. Sci.* 1: 431-443. *Fig. 1-16.* 1921.—*Palmoxylon cheyennense* is described in detail from the Pierre Cretaceous of South Dakota, and *Palmoxylon cannoni* from the lower part of the Denver formation (Eocene) of Colorado.—*E. W. Berry.*

386. T., H. H. [Rev. of: SCOTT, D. H. *Studies in fossil botany.* Vol. 1, 3rd ed., 8vo., 434 p., 190 fig. A. & C. Black: London, 1920.] *Jour. Botany* 59: 53-55. 1921.

387. TWENHOFEL, W. H. The Comanchean and Dakota strata of Kansas. *Amer. Jour. Sci.* 49: 281-297. 1920.—The paper contains a number of references to the Dakota flora.—*T. J. Fitzpatrick.*

388. WIELAND, G. R. Paleobotany as viewed by two geologists. *Science* 53: 437-439. 1921.—A note on geological climates.—*E. W. Berry.*

PATHOLOGY

G. H. COONS, *Editor*

C. W. BENNETT, *Assistant Editor*

(See also in this issue Entries 5, 6, 15, 27, 30, 39, 40, 46, 47, 48, 50, 58, 82, 91, 139, 230, 235, 288, 349, 352, 353, 362, 363, 364, 365, 366, 367, 370, 529, 530)

PLANT DISEASE SURVEY; REPORT OF OCCURRENCE AND SEVERITY

389. ANONYMOUS. Report on the prevalence of some pests and diseases in the West Indies during 1918. *West Indian Bull.* 18: 34-60. 1920.—A compilation from the reports of the principal agricultural officers in each of the colonies under the auspices of the Imperial Department of Agriculture. The degree of prevalence of the various diseases attacking local crops is given with suitable notes.—*J. S. Dash.*

390. BUTLER, E. J. Report of the Imperial Mycologist. *Sci. Rept. Agric. Res. Inst. Pusa* 1919-20: 58-67. 1920.—The report is a statement of progress in a number of lines of investigation. In "black band" of jute (*Corchorus olitorius* and *C. capsularis*), caused by *Diplodia Corchori* Syd., red-stemmed varieties are found to be slightly less susceptible than others; treatment of seed with fungicides is of little value, as the spores are not disseminated

along with seed to any appreciable extent.—Spraying was continued in orchards in Kumaon (outer Himalayas).—Identification of, and inoculation experiments in, *Fusarium*, *Helminthosporium*, *Acrothecium*, and *Rhizoctonia* diseases of cereals is in progress.—Rot in stored potatoes appears to be due to excessive temperature, and not primarily to fungous invasions.—A root rot of cotton (*Gossypium*) appears to be associated with some unknown soil conditions.—A fungous flora of India is in preparation. "The total number of recorded species is probably under 2000, which is certainly not one-fourth of those that exist."—The report closes with a program for work in 1920-21, and a list of publications for the year.—Winfield Dudgeon.

391. NOWELL, W. A disease of coco-nut. Imp. Dept. Agric. West Indies Rept. Agric. Dept. St. Lucia 1918-19: 7. 1920.—Diseased specimens when received by the author were in bad condition; nevertheless a phycomycete resembling *Pythium* or *Phytophthora* was much in evidence on the central shoot and unexpanded leaflets. Because of parasitic habits of this group, this organism is suspected of having etiological relationships. Question arises whether this fungus is related to *Pythium palmivorum*, the bud-rot organism of the East recently suspected of causing coconut disease in Jamaica. Fructifications in the St. Lucia fungus are round or nearly so, and resemble the zoosporangia of *Pythium deBaryanum* more than do the pear-shaped *Phytophthora*-like sporangi of *Pythium palmivorum* and the Jamaica species. Further investigation is needed. Meanwhile, Bordeaux or Burgundy mixture, preferably with milk or resin soap to increase adhesion, is recommended for controlling the disease.—J. S. Dash.

392. SCHMITZ, HENRY. Observations on some common and important diseases of the rhododendron. *Phytopathology* 10: 273-278. 11 pl. 1920.—The important diseases of the rhododendron on the Pacific coast are summarized as follows: *Sporocybe azaleae*, *Melampsoropsis piperiana*, witches' brooms, white leaf, *Lophodermium rhododendri*, *Coccomyces dentatus*, *Coryneum rhododendri*, *Sphaerella rhododendri*, *Pestalozzia guepini*, and *Cryptostictis* sp. The symptoms of all these diseases are described and control measures are suggested for some.—Ruth G. Bitterman.

393. SCHNEIDER, GEORG. Der Kartoffelkrebs, eine eigenartige neue Kartoffelkrankheit in Deutschland. [The potato wart, a peculiar new potato disease in Germany.] 8 p., 5 fig. P. Parey: Berlin, 1918.—(Mitteil. K. Marine-Intendantur, Wilhelmshaven.)—A circular for the practical gardener and farmer giving the history and distribution of the potato wart disease in Germany, and an account of the life history of the pathogene. Emphasis is placed on the fact that this disease may become a serious factor in field potato culture although it is now restricted to home gardens in industrial centers where continuous potato culture is practiced and field sanitation unknown. Recommendations for preventing its further spread are given and the experience of England with the potato wart disease is cited as a warning to Germany.—The spread of initial infection is thought to be due to penetration of the deeper-lying tissues by swarm-spores liberated in the superficial tissue layers. The finding of sporangia in the base of an epidermal hair is reported.—F. Weiss.

394. TAYLOR, H. V. The distribution of wart disease. Jour. Ministry Agric. Great Britain 27: 733-738, 863-867. 1920.

395. TAYLOR, H. V. The distribution of wart disease. Jour. Ministry Agric. Great Britain 27: 946-953. 1921.

396. VOGLINO, P., E V. BONGINI. Malattie riscontrate nel mese di Dicembre. [Diseases observed in December.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 1: 2-3. 1919.—The list of diseases includes apricot gummosis, *Polyporus igniarius* on cherry, *Botrytis cinerea* and *Gymnosporangium tremelloides* on apple, *Fusicladium pirinum* on pear, *Bacillus ampelopsorae* on grape, *Sclerotinia libertiana* on carrot, lettuce bacteriosis, and *Phytophthora infestans* on potato.—Edith K. Cash.

397. VOGLINO, P., E V. BONGINI. Malattie riscontrate nel mese di Gennaio. [Diseases observed in January.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino. 2: 2-3. 1919.—The following fungous and bacterial diseases are mentioned: *Clasterosporium carpophilum* on apricot, cherry, and almond, mulberry root-rot, *Septoria limonum* on lemon, *Botrytis cinerea* on apple, peach gummosis, *Septoria veronicicola* on *Veronica formosa*, *Phoma viticola* and *Bacillus ampelopsorae* on grape, *Sclerotinia libertiana* on carrot, *Polydesmus exitiosus* on cauliflower, *Septoria dianthi* on carnation, *Bremia lactucae* on lettuce, *Fusarium solani* and *Phytophthora infestans* on potato.—Edith K. Cash.

398. WESTON, WILLIAM H., JR. Another conidial Sclerospora of Philippine maize. Jour. Agric. Res. 20: 669-684. Pl. 76-78. 1921.—A new species of *Sclerospora* (*S. spontanea*) has been found producing mildew of maize and rarely of sugarcane and bugang grass (*Saccharum officinarum*) in the Visayan Islands of Cebu, Bohol and Leyte. It is indistinguishable from *Sclerospora philippinensis*, previously described, in its virulence, host range, and in the symptoms produced on the various hosts in the field. However, extensive studies of fresh material show this species to be morphologically distinct from *S. philippinensis* and other oriental forms. Teosinte and *Miscanthus japonicus* have been infected by inoculation. The author is of the opinion that the oriental downy mildews are native on wild grasses.—H. E. Thomas.

THE PATHOGENE: BIOLOGY; INFECTION PHENOMENA; DISPERSAL

399. ROSEN, H. R. The behavior of telia of *Puccinia graminis* in the South. Mycologia 13: 111-113. 1921.—Telia of *Puccinia graminis* as a rule are not abundant in the South, and those which are found are often undersized and fail to develop viable teliospores. The exception noted is the production of normal telia in the fall on *Elymus australis*. The teliospores on this host were successfully overwintered and infections were obtained on barberry.—H. R. Rosen.

400. WALKDEN, H. The isolation of the organism causing crown gall on *Chrysanthemum frutescens* in Britain. Ann. Botany 35: 137-138. 1921.—The writer describes an organism isolated from crown gall on *Chrysanthemum frutescens*. Inoculations on healthy plants reproduced the galls, and the organism was repeatedly re-isolated from the galls produced in this way. The characters of this organism proved identical with those of an authentic culture of *Bacterium tumefaciens*.—W. P. Fraser.

401. WARTENWEILER, ALFRED VON. Beiträge zur Systematik und Biologie einiger Plasmodiophora-Arten. [Contribution to the taxonomy and biology of some species of Plasmodiophora.] Ann. Mycol. 16: 249-298. 3 pl., 12 fig. 1918.—As a result of extensive morphological studies of conidia and conidiophores from *Plasmodiophora nivea* (Ung.) Schröet., *P. pygmaea* (Ung.) Schröet., and *P. densa* (Rabh.) Schröet. from different hosts, *P. nivea* is separated into 6 forms: (a) On various umbellifers, (b) on *Anthriscus silvester* and *A. cerefolium*, (c) on *Conium maculatum*, (d) on *Laserpitium latifolium*, (e) on *Angelica refracta*, (f) on *Peucedanum palustre*. *Plasmodiophora pygmaea* is divided into 4 forms: (a) On *Anemone canadensis* and *A. caroliniana*, (b) on *Anemone raddeana* and *A. flaccida*, (c) on *Astragale alpina*, (d) on *Anemone hepatica*. In *P. densa* some variations in conidia and conidiophores are found but no division of the species is made. Graphs are given of a large number of spore measurements, mostly from 500 to 1000 from each of the different host plants. Mycelium of *P. nivea* found in the rhizomes of *Laserpitium latifolium* is described and illustrated. Whether this mycelium is in all cases perennial or not is connected with the question as to the first infection, which has not yet been determined. Other hosts showed no mycelium in rhizomes. The few inoculation experiments made were unsatisfactory and mostly negative. It is stated that if a generalization can be made from this study it is that the fungous forms from similar regions are in many, but by no means all, cases similar; but these similar forms do not occur on closely related hosts.—C. L. Shear.

THE HOST (RESISTANCE; SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

402. KOTTUR, G. L., AND M. L. PATEL. Malformation of the cotton plant leading to sterility. *Agric. Jour. India* 15: 640-643. *Pl.* 43-45. 1920.—Malformation of the cotton plants shows itself when 2-3 months old. The leaves are smaller and bunched, at first of an unusual dark green color changing to reddish and pinkish yellow as the malformation advances; the plants die without producing seed. The disease does not occur among American and Egyptian varieties. The Indian cottons, Surtee-Broch, Goghari and Wagod, are most affected. Light rainfall seems to favor the disorder and it is worse on alkali lands and where cotton is grown continuously without rotation. Where light soil is used the affection is less. The disease is not hereditary.—*J. J. Skinner.*

403. LEES, A. H. Reversion of blackcurrants: A method of identification. *Jour. Ministry Agric. Great Britain* 27: 1122-1127. 7 fig. 1921.—Leaves on reverted plants produce fewer submain veins and the leaf edges are less serrated. The abnormality begins about the middle of May; the early leaves may be normal. Propagation from normal stock and the rogueing of diseased individuals are recommended as control measures.—*C. W. Bennett.*

404. SUNDBERG, ROBERTO. Causas y sintomas de enfermedades en las plantas. [Causes and symptoms of plant diseases.] *Defensa Agric. [Uruguay]* 1: 131-133, 160-163. 1920.—A very general account of the relation of heat, light, water, soil, and cultural conditions to health in plants.—*John A. Stevenson.*

405. VINCENS, M. F. Note sur les formations ligneuses anormales dans l'écorce de l'*Hevea brasiliensis*. [Note on abnormal woody formations in the bark of *Hevea brasiliensis*.] *Compt. Rend. Acad. Sci. Paris* 171: 871-873. 1920.—Three types of abnormal woody formations are indicated by bark irregularities: (1) The healed wounds from bleeding, (2) small, somewhat pointed projections, of disputed origin, with a hard woody core, often independent of the normal wood or joined to it by a short slender strand, (3) plates made up of branched and interwoven strands of variable diameter (1 mm. to 1 cm.) and considerable extent. Sections show structure similar to secondary wood surrounding some cells which appear dead but on staining with Sudan III were shown to be laticiferous and to communicate with other cells of the same type. The strands are surrounded by generative tissue. *RUTGERS* studying this condition in Java reported that the death of the central cells was caused by *Phytophthora Faberi*. Vincens' observations from Cochin China do not support this view. He fails to find mycelium necessarily associated with the production of these structures but always finds a bacterium and sometimes also a *Fusarium*, but thinks the latter negligible since no mycelium was observed. Many bacteria live in the latex.—*Eloise Gerry.*

DESCRIPTIVE PLANT PATHOLOGY

406. ANONYMOUS. El carbon volante del trigo. [Loose smut of wheat.] *Defensa Agric. [Uruguay]* 1: 312-318. 5 fig. 1920.—A description of the disease caused by *Ustilago tritici*, which has been very prevalent in Uruguay, is given.—*John A. Stevenson.*

407. ANONYMOUS. Enfermedades de las plantas producidas por hongos. [Plant diseases produced by fungi.] *Defensa Agric. [Uruguay]* 1: 79-83. 7 fig. 1920.—A popular account of fungi as to structure, spore production, and spore germination.—*John A. Stevenson.*

408. ANONYMOUS. Potato disease (blight [*Phytophthora infestans*]) in 1920. *Jour. Ministry Agric. Great Britain* 27: 1146-1147. 1 fig. 1921.

409. ANONYMOUS. Sugar cane disease. *South African Sugar Jour.* 5: 201-203. 1921.—An account of the sugar cane diseases in Natal and Zululand is given. The diseases listed are as follows: A root disease caused by a soil fungus, *Himantia stelligera*, which has also been

observed on the "umthente" grass (*Imperata arundinacea*); two leaf spot diseases,—the ring spot caused by *Leptosphaeria sacchari*, and the eye spot caused by *Helminthosporium sacchari*; and 2 stalk diseases caused by *Melanconium sacchari*, the "rind disease" fungus, and *Cephalosporium sacchari*. *Colletotrichum falcatum* has not been observed here. *Schizophyllum commune* has been found in Zululand on old cane stalks lying on the ground, but never on standing cane. The fungus is common everywhere on old stumps and logs of various trees, and occurs also as a wound parasite of fruit trees. In addition to these diseases caused by fungi, there is a physiological trouble,—the occurrence in the internodes of strips of spongy tissue or cavities surrounded by spongy tissue. The cells of the spongy tissue are dead, filled with air, and no sucrose collects in them. Such spongy stalks are readily attacked by fungi.—E. K. Tisdale.

410. ANONYMOUS. Wither-tip and brown rot of plums. Jour. Ministry Agric. Great Britain 27: 1142-1145. 6 fig. 1921.

411. ARNAUD, G. Une maladie bactérienne du lierre (*Hedera Helix* L.). [A bacterial disease of *Hedera Helix*.] Compt. Rend. Acad. Sci. Paris 171: 121-122. 1920.—A disease caused by *Bacterium hederæ* n. sp., is found occurring on the leaves. It may be distinguished from that caused by *Phyllosticta* by the transparency of the leaf spots.—C. H. Farr.

412. ASHEY, S. F. Notes on two diseases of the coco-nut palm in Jamaica caused by fungi of the genus *Phytophthora*. West Indian Bull. 18: 61-73. 1920.—Part I of the article deals with a bud rot caused by *Phytophthora palmivora*. The macroscopic and microscopic characters of the disease are given, as well as results of inoculations from pure cultures. Identification of the pathogene, its distribution, infection, spread, and treatment are fully dealt with. Comparisons are made with other types of bud rot.—Part II treats of a leaf-stalk rot caused by *P. parasitica*. Notes on the symptoms, etiology and control are recorded.—J. S. Dash.

413. CHEN, CHUNJEN C. [Some important cotton diseases.] Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] 6: 168-175. 1921. [Text in Chinese.]—The cause, symptoms, means of transmission, and control of the following important cotton diseases are reviewed: Angular leaf spot, anthracnose, wilt, root-knot, potash-hunger, damping-off, root rot, *Diplodia* boll rot, shedding of bolls and squares, leaf spot, and club-leaf.—Chunjen C. Chen.

414. DUFRENOY, JEAN. Sur des tumeurs bactériennes expérimentales de l'Épicea. [Bacterial tumors experimentally produced on *Picea*.] Compt. Rend. Acad. Sci. Paris 171: 874-876. Fig. 1-3. 1920.—Cambium of the canker may be used to infect a healthy tree. Bacteria found in the cankers are described but are not named.—C. H. Farr.

415. GIACCONE, V. Los principales enemigos del viñedo. [The principal enemies of the vineyard.] Defensa Agric. [Uruguay] 1: 67-70. 1920.—A popular account of the more important parasitic and non-parasitic diseases of the grape, including *Oidium*, *Plasmopara*, "black-rot," chlorosis, and root rot.—John A. Stevenson.

416. GIRARDI, JOSÉ. La chlorosis de las plantas. [Chlorosis of plants.] Defensa Agric. [Uruguay] 1: 300-302. 1920.

417. GIRARDI, JOSÉ. Tumor bacteriano del duraznero. [Bacterial tumor of the peach.] Defensa Agric. [Uruguay] 1: 279-281. 1 fig. 1920.—A gall forming disease of the peach said to be distinct from crown gall (*Bacterium tumefaciens*) is described and attributed to *Bacterium persicae*, n. sp.—John A. Stevenson.

418. GRAEBNER, PAUL. Lehrbuch der nichtparasitären Pflanzenkrankheiten. [Text-book of non-parasitic plant diseases.] vii + 333 p., 245 fig. Paul Parey: Berlin, 1920.—In a concise textbook written from the standpoint of both the gardener and botanist, the writer seeks to cover the diseases and weakened conditions of plants brought about by non-parasitic

agencies in which parasites are at least secondary. For the most part the book aims to give a short presentation of the material for teaching purposes, rather than a fuller presentation, such as given by SORAUERS' *Handbuch der Pflanzenkrankheiten*, I. The book, however, uses the plates from the Sorauer text and the arrangement of the material is similar. Following a general introduction dealing briefly with the history of the subject, the concept of disease, and the causes of plant disease, the relation of climate and geographical location and plant disease is outlined. In the main body of the work the form of presentation is largely descriptive, and the material is presented under 6 topics: (1) Unfavorable soil; (2) air conditions (moisture, dryness, wind); (3) heat and light; (4) wounds; (5) injurious gases and liquids; (6) enzymatic diseases (panachure, mosaic, gum and resin flow). The book is indexed and some literature references are made.—*G. H. Coons.*

419. HUDIG, J., en C. MEYER. *De Veenkoloniale haverziekte III.* [The marsh-colony disease of oats, III.] Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. 23: 1-39. Fig. 1-15. 1919.—In pure quartz sand free from organic substances, oats may be grown in a mixture of salt solutions which are basic, though the plants should not have too long a period of growth. An addition of roots of oats, stalks of oats, and cotton batting to the sand in quantities of 0.75-2 per cent causes the disease, independent of early or late sowing or cold or warm weather. The presence of a basic fertilizer is necessary. Under the same conditions extracts of roots of oats have the same effect as added pieces of roots. Leaves of oats added in the same quantities have a favorable effect upon the plants. Sand cultures to which acid salts or nitrites are added never develop the disease. Manganese sulphate appears best suited to combat the disease. [See also following entry.]—*J. C. Th. Uphof.*

420. HUDIG, J., en C. MEYER. *De Veenkoloniale haverziekte IV.* [The marsh-colony disease of oats, IV.] Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. 23: 128-158. Fig. 1-8. 1919.—The disease, which may become very dangerous, appears as a striped chlorosis and is caused by alkali in the soil solution. A decoction of decomposing cellulose in sand containing alkali may cause the disease; potato starch has the same effect. Material containing cellulose is harmless if the environment is acid; also if manganese sulphate or sulphur is applied. Sulphur flour is oxidized to sulphuric acid in aerobic sand cultures. [See also preceding entry.]—*J. C. Th. Uphof.*

421. JAGGER, IVAN C. A transmissible mosaic disease of lettuce. *Jour. Agric. Res.* 20: 737-739. Pl. 87. 1921.—The disease occurs in Florida, North Carolina, and New York.—Romaine lettuce (Paris White Cos) and head lettuce (Big Boston) are affected. Typical mottling and wrinkling occur. All variations are found from very slight mottling with no apparent injury to pronounced mottling and very evident dwarfing of plants. Transmission experiments with the aphid, *Myzus persicae*, were successful.—*D. Reddick.*

422. NOWELL, W. The red ring disease of coco-nut palms. *West Indian Bull.* 18: 73-76. 1920.—A more complete report is given on infection experiments carried out in Grenada, West Indies, which supplements earlier notes on the same subject (see *Bot. Absts.* 4, 1327). The results support the idea that infection occurs in the leaf bases, and may frequently take place by way of the small cracks formed by the bending outwards of the leaf as it matures. This would render untenable a previous hypothesis that infection takes place at an early age, the effects manifesting themselves only on the maturing of the tree.—*J. S. Dash.*

423. OORTWIJN BOTJES, J. G. *De bladrolziekte van de aardappelplant.* [Leafroll disease of the potato plant.] 136 p. 8 pl. Wageningen, 1920.—The primary symptoms can easily be mistaken for those of other diseases, but the secondary ones are definite and in this period occurs the rolling up of the leaves. On infested plants grown from healthy tubers, symptoms often can not be noticed during the 1st period of growth. The necrosis of the phloem is typical and this is accompanied by a retardation in the transfer of starch. External symptoms can be observed about 10-30 days after the tubers start growth. Leafroll disease is contagious;

the cause is unknown. Transfer of the infection takes place through agency of plant lice. Artificial inoculations have failed; soil infection seems to be excluded. Some strains are resistant, others are not; selection of resistant plants is advisable.—*J. C. Th. Uphof*.

424. YEH, YUEN TING. [Translation of: COOK, O. F. A disorder of cotton plants in China: Club-leaf or Cyrtosis. *Jour. Heredity* 11: 99-110. 1920 (see Bot. Absts. 8, Entry 532).] Hua-Shang-Sha-Chang-Lien-Ho-Hui-Ki-Kan [*China Cotton Jour.*] 2²: 235-240. Fig. 1-10. 1921.

ERADICATION AND CONTROL METHODS

425. ANONYMOUS. Calendario para los tratamientos preventivos y curativos de las plantas. [Calendar of preventive treatments and remedies for plant diseases.] *Defensa Agric.* [Uruguay] 1: 61-64. 1920.—Treatments recommended for pests and fungous diseases of pear, apple, plum, and other fruits are outlined.—*John A. Stevenson*.

426. ANONYMOUS. Cura de las semillas de triga. [Treatment of seed wheat.] *Defensa Agric.* [Uruguay] 1: 115-119. 6 fig. 1920.—The paper outlines copper sulphate and formalin treatments of seed wheat as smut preventives.—*John A. Stevenson*.

427. ANONYMOUS. The inspection of potato crops during 1920. *Jour. Ministry Agric.* Great Britain 27: 954-957. 1921.

428. ANONYMOUS. E mildiou o blanco de los zapallos. [Cucumber mildew.] *Defensa Agric.* [Uruguay] 1: 12-13. 1920.—Bordeaux treatment is advised for powdery mildew (*Oidium* sp.) of cucumbers.—*John A. Stevenson*.

429. BERG, R. C. VAN DEN, RZN. Ontsmettingsproef tegen steenbrand by tarwe. [Treating wheat against stinking smut.] *Tijdschr. Plantenz.* 27: 17-19. 1921.—In this experiment 125 l. of wheat, smutted artificially by mixing with 100 cc. of smut kernels (*Tilletia tritici*), were treated in part with copper sulphate and in part with Uspulun. In the 1st case the seed was sprinkled thoroughly with a solution of copper sulphate (100 gm. of copper sulphate dissolved in 1.25 l. of water for every 50 l. of grain). In the 2nd case it was sprinkled with Uspulun (20 gm. of Uspulun dissolved in 4 l. of water for every 50 l. of grain). In both cases the seed was thoroughly mixed during the sprinkling and was planted immediately after treatment. The following numbers give the results in the various plats, in terms of smutted heads in 780 heads: Untreated—52, 69; Uspulun—11, 9, 28; copper sulphate 1, 0, 0.—*D. Atanasoff*.

430. BIRMINGHAM, W. A. A treatment for tomato wilt on trial. *Agric. Gaz. New South Wales* 32: 212. 1921.—A popular treatment for tomato wilt was tried with negative results.—*L. R. Waldron*.

431. BOVELL, J. R. Plant inspection and fumigation. Rept. Dept. Agric. Barbados 1917-1918: 31-32. 1920.—When the Bourbon cane succumbed to the attacks of *Colletotrichum falcatum* it was replaced by the White Transparent, which often grew in the same hole as badly attacked Bourbon canes, but remained resistant. It now appears, according to the author, that after many years of cultivation in the Colony, the White Transparent has lost its immunity to the disease in question. *Cercospora vaginæ* and *Marasmius sacchari* were also in evidence and will continue so long as planters do not select cane-planting material more carefully. The green scale, *Coccus viridis*, was successfully controlled by spraying with spores of *Cephalosporium lecanii* suspended in water.—*J. S. Dash*.

432. EASTHAM, J. W., AND E. C. HUNT. Spraying for apple scab in the Kootenays. *Agric. Jour.* [British Columbia] 6: 38-39. 1921.—Results are recorded of comparative tests with lime-sulphur and the modified Bordeaux mixture with soluble sulphur as calyx spray recom-

mended in Nova Scotia. The Bordeaux gave satisfactory results in scab control and increased yield in the case of McIntosh and Northern Spy, especially the former. 10 per cent russeting occurred in McIntosh; the amount was negligible in Northern Spy. Foliage was better throughout the season on the Bordeaux plot. Sulphur dust, with arsenate of lead added for one application only, gave very poor results, the percentage of scab being as high as 89 on McIntosh. Sander's "Copper dust" gave good results under similar conditions.—J. W. Eastham.

433. FANTINI, NICOLÁS. La antracnosis y medios de curación. [Anthracnose and its cure.] *Defensa Agric.* [Uruguay] 1: 179-180. 1920.—Popular discussion of grape anthracnose (*Gloeosporium ampelophagum*).—John A. Stevenson.

434. FROMME, F. D., G. S. RALSTON, AND J. F. EHEART. Dusting experiments in peach and apple orchards in 1920. *Virginia Agric. Exp. Sta. Bull.* 224. 12 p., 1 fig. 1921.—A sulphur dusting mixture (80 parts sulphur, 10 parts hydrated lime, 10 parts arsenate of lead) gave very satisfactory control of peach scab, but the data on brown-rot were insufficient to furnish a basis for conclusions. Severe cracking of peach fruits resulted from excessive applications of the dust. Three dusts were used on apples: Sulphur dust, copper-lime dust, and Bordeaux dust. The 1st proved much more effective in the control of apple scab than either of the other 2 mixtures, and gave results almost as good as those obtained on the spray plots. Neither of the copper dusts proved at all effective in the control of bitter-rot on apples. A comparison of the results of the season's tests with those of previous years in Virginia is included.—F. D. Fromme.

435. GIACCONE, V. Como curar el duraznero en primavera y principio de verano. [Treatment of the peach in spring and early summer.] *Defensa Agric.* [Uruguay] 1: 293-294. 2 fig. 1920.—Treatment for *Exoascus deformans* and *Aphis persicae* is given.—John A. Stevenson.

436. HARDENBURG, E. V. Seed potato problems. *Potato Mag.* 3¹⁰: 22-23, 25, 30. 1921.—Variety tests require several strains from a variety group that has been found suitable locally. Careful attention may prevent degeneration. Seed certification helps to supply good seed because of its effect in controlling leafroll and mosaic. For 5 or more acres, an isolated seed plot is desirable. Usually not enough seed per acre is planted.—Donald Folsom.

437. MARTIN, WILLIAM H. A comparison of inoculated and uninoculated sulfur for the control of potato scab. *Soil Sci.* 11: 75-85. Pl. 1, fig. 1-3. 1921.—Uninoculated commercial flour sulphur and commercial flour sulphur inoculated with 1 per cent of soil from a compost heap known to contain sulphur oxidizing organisms, was added to the soil just before planting potatoes in scab infested land. Hydrogen-ion exponents of soil samples taken from plots treated with inoculated sulphur were lower than of those treated with uninoculated sulphur. In most instances the increase in acidity was accompanied by a corresponding decrease in the number of unsalable scabby potatoes. [See also following entry].—W. J. Robbins.

438. MARTIN, WILLIAM H. Relation of sulfur to control of potato scab. *Potato Mag.* 3⁹: 5-6, 22-23. 4 fig. 1921. [See also preceding entry.]

439. N [ORRIS], F. DE LA M. Notes on the field-treatment of mouldy rot. *Agric. Bull. Federated Malay States* 8: 113-116. 1921.—Mouldy rot is a disease of the tapped surface of the Para rubber tree, *Hevea brasiliensis*, one of the causes of which is a fungus assigned to the genus *Sphaeronema*. Cleanliness of tapping knives and disinfectant paints appear to check it.—I. H. Burkill.

440. PORTER, R. H. A two-minute treatment of seed potatoes. *Potato Mag.* 3⁹: 8-9. 2 fig. 1921.

441. SALMON, E. S., and H. WORMALD. Prevention of "bunt" in wheat. Jour. Ministry Agric. Great Britain 27: 1013-1021. 1921.—Field tests were conducted during 1919 and 1920 on the value of copper sulphate and formalin seed treatments for the control of "bunt," *Tilletia tritici*, in wheat. The chief solutions used were copper sulphate 1 and 2½ per cent and formalin 1:320 and 1:240. These were sprinkled over the grain at the rate of 1 gallon to 2 bushels of grain, after which the copper sulphate treated grain was spread out at once to dry and the formalin treated grain was placed in a heap and covered with sacks for 4 hours, and finally spread out to dry.—The percentage of germination of the treated grain was only slightly reduced when the above treatments were used, but in a few preliminary tests with stronger solutions of copper sulphate, up to 5 per cent, the injury to germination was considerable. Therefore the practice which is common in Britain of using 10 per cent copper sulphate solution for treatment should be discouraged.—The formalin treatments gave complete control of "bunt" whereas the copper sulphate treatments were much less effective. Treatment with formalin 1:320 is recommended.—*M. B. McKay.*

442. SOSA, H. A. Como evitar las enfermedades en las plantas. [How to avoid plant diseases.] Defensa Agric. [Uruguay] 1: 141-144. 1920.

443. SULLIVAN, K. C. Plant inspection in Missouri. Missouri Agric. Exp. Sta. Circ. 101. 16 p. 1920.

444. THOMAS, R. C. Brown rot of peaches and its control. Monthly Bull. Ohio Agric. Exp. Sta. 6: 26-30. 1921.—Brown rot attacks plums and peaches, beginning in May and continuing through the summer. Control measures are considered under 2 heads, (1) sanitary precautions and (2) protective sprays. Lime-sulphur-glue spray was found to be very satisfactory for the control of brown rot and other mid-season peach diseases. At the close of the article a spray calendar for peach is given.—*R. C. Thomas.*

445. TRUJILLO, AUGUSTIN. El Oidium y modo de combatirlo. [Oidium and the method of combating it.] Defensa Agric. [Uruguay] 1: 120-121. 1920.—Powdery mildew of the grape.—*John A. Stevenson.*

446. TRUJILLO, AUGUSTIN. El Oidium y modo de combatirlo. [Treatment for Oidium.] Defensa Agric. [Uruguay] 1: 141. 1920.—The writer advocates the use of sulphur or sulphur compounds for powdery mildew (*Oidium*) of the grape.—*John A. Stevenson.*

447. VERMOREL, V., ET E. DANTONY. La defense de nos jardins contre les insectes et les parasites. 13 × 22 cm., 232 p., 12 pl (colored). Progres Agricole et Viticole: Villefranche-Montpellier, 1919 (?).—Small handbook for French growers, containing descriptions and illustrations of the principal insect pests and fungous diseases, with chapters on disease and insect control.—*D. Reddick.*

448. VOGLINO, P., E V. BONGINI. Consigli pratici per il mese di Febbraio. [Control measures recommended for the month of February.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 1919¹: 1. 1919.—The brown spot of cherry caused by *Clasterosporium carpophilum*, which was rather prevalent last year, may be checked by the application of 3 per cent copper-lime paste on the trunk and branches. The same treatment may also be given for gummosis of peach, apricot, and almond. Use of flowers of sulphur will prevent the development of fungous diseases on hot-house plants.—*Edith K. Cash.*

449. VOGLINO, P., E V. BONGINI. Consigli pratici per il mese di Gennaio. [Control measures recommended for the month of January.] Pubbl. Mens. R. Osservatorio Fitopatol. Torino 1919¹: 1-2. 1919.—Spraying peach trees with a 5 per cent solution of ferrous sulphate or 3 per cent copper sulphate and lime is advised as a preventive against leaf curl (*Exoascus deformans*) and mildew (*Sphaerotheca pannosa*). Stored tubers should be spread out and aired to guard against molds.—*Edith K. Cash.*

MISCELLANEOUS (COGNATE RESEARCHES, TECHNIQUE, ETC.)

450. ANONYMOUS. Fäulniserreger in Rübenmieten. [Producers of decay in beet pits.] Mitteil. Deutsch. Landw. Ges. 36: 185. 1921.—This note calls attention to the discovery of *Botrytis cinerea* as the cause of decay in stored swedes.—A. J. Pieters.

451. HOXIE, F. J. Treated lumber for insulating roofs of moist factories. American Wood Preservers' Association: 1921.—Method is described of insulating a New England cotton-mill roof to prevent decay and sweating. Seven-eighths inch pine boards were treated in an open concrete tank (out-of-doors) for 20 hours in creosote at a temperature of 220°F.; 6 lbs. of creosote was absorbed per cubic foot. The boards were applied to the old roof without removing the slag or paper, on $\frac{7}{8}$ inch sleepers, leaving an air space between the slag and new roof. Upon the treated new surface was placed the usual 5-ply tar paper and slag. [Paper presented at 17th annual meeting American Wood Preservers' Association, Jan., 1921.]—Walter H. Snell.

452. WALDRON, J. W., C. R. HEMENWAY, J. N. S. WILLIAMS, WM. SEARBY, T. H. PETRIE, J. K. CLARKE, and H. P. AGEER. Report of the committee in charge of the experiment station. Rept. Exp. Sta. Hawaii Sugar Planters' Assoc. 1920: 1-4. 1920.—A discussion is presented of certain fungous and insect enemies of sugarcane, together with reports as to progress of the investigations concerning the improvement of sugarcane by seed selection, the possibilities of reducing the purity of the final molasses, and the condition of the soils of the various sugar plantations. The forestry situation as related to sugar production and the insect and disease enemies of forest trees are also considered.—J. M. Westgate.

453. WILDEMAN, E. DE. Sur les théories de la myrmécophylie. On the theories of myrmecophily.] Compt. Rend. Acad. Sci. Paris 172: 124-126. 1921.—This phenomenon is generally attributed to gall formation due to the activity of insects, but the author disagrees with this as a generalization universally applicable. He finds cases especially in *Acacia* in which the gall is apparently not to be attributed to insect activity. In some cases it has become hereditary. The relationship when insects are present seems to be more of a parasitism than a symbiosis.—C. H. and W. K. Farr.

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 15, 35, 47, 59, 70, 105, 574)

454. ANONYMOUS. [Rev. of: KRAEMER, H. Scientific and applied pharmacognosy. 2nd ed., xxviii + 741 p. John Wiley and Sons: New York; Chapman and Hall: London, 1920.] Nature 106: 531. 1920.

455. BARDIER, E., ET E. MARTIN-SANS. Variabilité de la toxicité du gui suivant son hôte. [Variability of the toxicity of mistletoe according to its host.] Compt. Rend. Soc. Biol. Paris 83: 379-381. 1920.—Official aqueous preparations from mistletoe growing upon spruce, apple, and poplar, when tested by intravenous injection into dogs and rabbits, showed great differences in toxicity, that from the poplar being far more poisonous than the extracts from mistletoe growing upon apple or spruce.—E. A. Bessey.

456. BLAIR, T. S. Habit indulgence in certain cactaceous plants among the Indians. Jour. Amer. Med. Assoc. 76: 1033-1034. 1921.—Legislation to prohibit the use of "peyote" is pending in the U. S. A. Congress. Commercial peyote includes various products of cactaceous plants having narcotic effects. Among these are the "mescal button,"—the fruits of *Anhalonium lewini*,—the use of which is spreading among the Indian tribes of the South-

west. Its evil effects are similar to those of the Oriental Indian Hemp (*Cannabis*). Unfortunately, the mescal buttons are regarded with superstitious reverence and are used in religious ceremonials.—*Wm. B. Day*.

457. BOHRISCH, P. Ueber Tupelostifte. [Concerning tupelo tents.] Pharm. Zentralhalle 62: 109-111. 1921.—The writer does not agree with BRAUN's statement, that tents made from tupelo wood, *Nyssa aquatica* L., are ineffective because they do not swell as readily as tents made from *Laminaria*. When the wood is pressed to from 1/4 to 1/5 of its diameter, it swells to about 3 times its thickness when placed in water.—*H. Engelhardt*.

458. BOULAY, A. Note sur les caractères et la composition de l'huile de Gillesiella congolana. [Character and composition of the oil of Gillesiella congolana.] Bull. Sci. Pharm. 27: 626-628. 1920.—The fruit of *Gillesiella congolana* contains about 51 per cent of a yellowish-brown, transparent oil which has a taste recalling that of oil of sweet almond. It has the sp. gr. 0.9159, a saponification value 192.5, and an iodine value 93.8. The combined fatty acids melt at 29°C., have a saponification value of 205.7, and the molecular weight 272.2. They consist of 35 per cent of solid and 65 per cent of liquid fatty acids. The former consist of erucic and palmitic acids, while the latter are composed of oleic acid with a small amount of linolenic acid. These constants do not quite agree with those given by PRIERAERTS, but the author believes that the discrepancy is due to the fact that the samples examined differed considerably in weight and in size.—*H. Engelhardt*.

459. BOUQUET, J. Documents sur la matière médicale indigène dans l'Afrique du Nord (Sud Tunisien.—Extrême-Sud Constantinois.—Maroc Occidental.) [Reports on the native medicinal plants of northern Africa (southern Tunis; southernmost Constantine; western Morocco).] Bull. Sci. Pharm. 23: 22-36, 73-84. 1921.—An exhaustive compilation of the various plants used for medicinal purposes in northeastern Africa.—*H. Engelhardt*.

460. BRIDEL, MARC. Sur la conservation des préparations galéniques de gentiane obtenues avec une racine de gentiane séchée à l'air sans fermentation. [The stability of galenical preparations of gentian, obtained with an air-dried gentian without fermentation.] Jour. Pharm. et Chimie 22: 411-418. 1920.—Both in the powdered drug and in the alcoholic extract, which had been kept for 9 years, no loss in carbohydrates had occurred. The loss in these substances was, however, a very great one in liquid alcoholic preparations. The percentage of gentiopierin was only slightly reduced in a tincture prepared with 95 per cent alcohol, but more so in other alcoholic preparations and especially in one prepared by extracting the drug with boiling alcohol. It had entirely disappeared from the powdered drug when the latter still contained an appreciable quantity of a glucoside hydrolyzable by emulsin, probably a cleavage product of gentiopierin. A tincture of gentian prepared by maceration with 60 per cent alcohol contained no gentiopierin from the time of its preparation, but contained a glucoside with a reducing factor almost equal to that of β ethylglucoside.—*H. Engelhardt*.

461. DELAUNAY, M. P. Présence de la loroglossine dans plusieurs espèces d'Orchidées indigènes. [Presence of loroglossin in several species of native Orchideae.] Jour. Pharm. et Chimie 23: 265-272. 1921.—The glucoside loroglossin which was isolated from *Loroglossum hircinum* Rich. by BOURQUELOT and BRIDEL could also be isolated from *Orchis simia* Lam., *O. bifolia* L., *Cephalanthera grandifolia* Babingt., *Ophrys aranifera* Huds., and *O. apifera* Huds. The Orchideae which are closely related botanically by their morphological character are also closely related chemically.—*H. Engelhardt*.

462. DIEDRICH, A., UND B. SCHMITTMANN. Über indisches Curry-Pulver. [Indian curry powder.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 361-364. 1920.—Chemical analyses.—*H. G. Barbour*.

463. MACKAY, A. H. The alkaloids of *Senecio Jacobaea*. *Nature* 106: 503. 1920.—Correction in earlier article (*Nature* 106: 321. 1920). The plant has not been fatal to sheep as it has to cattle.—O. A. Stevens.

464. MAIDEN, J. H. Plants which produce inflammation or irritation of the skin. *Agric. Gaz. New South Wales* 32: 206. 1921.—Evidence is meagre that "brigalow itch" is caused by brigalow, *Acacia harpophylla*. *Xanthium strumarium* and species of *Callitris* (pine) are said to cause dermatitis.—L. R. Waldron.

465. MAUE, G. Über die Inhaltsstoffe der Rhabarberblätter. [Content of rhubarb leaves.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 40: 345-350. 1920.—The leaves are the most valuable part of rhubarb as a vegetable. The only constituents responsible for various cases of poisoning are the acids known as emodin (frangulinic) and chrysophanic acids, which are bound to soluble oxalic acid and oxymethylanthrochinon.—H. G. Barbour.

466. PIERAERTS, J. Sur l'*Héritiera littoralis* Ait. [Concerning *Heritiera littoralis* Ait.] *Bull. Sci. Pharm.* 23: 15-22. *Pl. 2, fig. 4.* 1921.—Kola nuts are frequently adulterated with the seeds of *Heritiera littoralis*, a plant native to East Africa but also found in other tropical countries of the Old World. The plant is a large tree, its wood grayish-brown, is very suitable for building material, and its bark, which is rich in tannins, is used for tanning purposes. The fruit is an akene, the pericarp of which is colored light brown externally, has a ligneous consistency and a more or less spongy internal texture. The dorsal surface of the fruit is convex, keel-shaped, and is provided throughout its length with a very pronounced median relief, which terminates at the rostrum. The seed does not contain caffeine and theobromine. Volatile oil is present in the drug; also a fixed oil, the latter amounting to 10 times the quantity present in kola. The fixed oil, unlike that of the kola nut, gives Halphen's reaction.—H. Engelhardt.

467. PRESCHER, J., UND R. CLAUS. Zwei eigenartige Ersatzmittel. [Two peculiar substitutes.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 40: 203. 1920.—A microscopic and chemical analysis of substitutes for cinnamon powder and rice starch. The substitute for the latter consisted of potato starch with ballast, such as sand, chalk, etc.—H. G. Barbour.

PHYSIOLOGY

B. M. DUGGAR, *Editor*

CARROLL W. DODGE, *Assistant Editor*

(See also in this issue Entries 105, 160, 226, 230, 280, 437, 460, 461, 540, 543, 546, 551, 552, 555, 556)

GENERAL

468. LUMIÈRE, AUGUSTE. Le mythe des symbiotes. [The symbiosis myth.] *xi + 205 p., 50 fig.* Masson et Cie.: Paris, 1919.—The material brought together in this little book is intended to exhibit some of the diverse rôles of microorganisms in nature, and more particularly to indicate the limited extent to which such organisms occur in symbiotic association with higher forms, and the specific nature of such associations. The facts are collated with the view of combatting the fundamental ideas of PORTIER to the effect that "the bacteria are the only simple organisms, all higher organisms being of a double nature;" that is, such higher forms include bacteria within their protoplasts. The work involves brief discussions of such topics as the following: Symbiosis in plants, as in orchids; the conditions of occurrence and the nature of the saprophytic organisms found occasionally or normally in certain organs of higher animals; vitamins; mitochondria; and aseptis.—B. M. Duggar.

DIFFUSION, PERMEABILITY

469. ANONYMOUS. [Rev. of: FINDLAY, ALEXANDER. *Osmotic pressure*. 2nd ed., xi + 116 p., 10 fig. Longmans Green & Co.: London.] *Sci. Prog.* [London] 14: 158-159. 1919.

470. BUSCALIONI, LUIGI. Nuove osservazioni sulle cellule artificiali. [New observations on artificial cells (conclusion).] *Malpighia* 28: 489-544. Pl. 3, fig. 1-2. 1920.—Experiments of the author have confirmed previous discoveries and added new data in regard to artificial cells, in which certain of the structures and physiological processes of living cells have been reproduced. Appended to the article is an extensive bibliography (pages 521-540) annotated by the author.—*Edith K. Cash*.

471. DIXON, H. H., AND T. G. MASON. A cryoscopic method for the estimation of sucrose. *Notes Bot. School Trinity Coll. Dublin* 3: 83-89. 1920.—Since the depression of the freezing point caused by a given quantity of sucrose in a given volume of water is approximately doubled after inversion, the sucrose content of a solution can be determined by 2 cryoscopic observations,—one before and the other after inversion. No preliminary treatment for the removal of gums, etc., is necessary. Such treatment would be necessary for both polarimetric and copper methods. By using the thermo-electric method of cryoscopy a very small amount of plant sap (2½ cc.) is sufficient for a determination. The probable error with this method is a little greater than with Fehling's solution.—*G. B. Rigg*.

472. MASON, T. G. On some factors affecting the concentration of electrolytes in the leaf-sap of *Syringa vulgaris*. *Notes Bot. School Trinity Coll. Dublin* 3: 67-82. 1920.—The determination of the concentration of electrolytes in leaf-sap by conductivity observations was found unsatisfactory unless allowance was made for the viscosity of the sap. To make this correction, the conductivity of the sap was determined, then $\frac{N}{10}$ KCl was dissolved in it and the conductivity again determined. Then the conductivity of $\frac{N}{10}$ KCl in aqueous solution was determined. By comparing the value obtained by the last observation with the difference between those obtained by the first 2 the effects due to viscosity were determined.—The osmotic pressure of the cell sap is frequently mainly due to electrolytes, but the presence of solutes that are neither electrolytes nor sugars may play a part. A tendency was found for the content of electrolytes to vary inversely with that of the non-electrolytes. It is suggested that these fluctuations are associated with the rate of carbon assimilation, which determines the rate at which electrolytes are removed from solution in metabolism.—*G. B. Rigg*.

WATER RELATIONS

473. BOUYOUCOS, GEORGE J., AND M. M. MCCOOL. Measurement of the amount of water that seeds cause to become unfree and their water soluble material. *Jour. Agric. Res.* 20: 587-593. 1921.—The amount of unfree water, consisting of (a) capillary and adsorbed, and (b) combined (water of hydration and water of solid solution), was determined by the type of dilatometer used in a previous study of soils (see Bot. Absts. 9, Entry 535). Fourteen different kinds of seeds were used. The amount of water that seeds cause to become unfree is very large. Repeated freezing and thawing tend to diminish considerably the amount of unfree water, especially in some seeds. Dry seeds contain a large amount of water-soluble matter as is evidenced by the high freezing point depression.—*Evelyn I. Fernald*.

474. HILL, T. G. The water economy of maritime plants. *Sci. Prog.* [London] 14: 60-80. 1919.—The author carried out a series of experiments with halophytic plants, particularly with such forms as *Salicornia* and *Suaeda*, on the coast of Brittany, supplemented by work in the laboratory. The investigations were concerned primarily with (1) osmotic relations, (2) transpiration, and (3) absorption.—It was found that the osmotic power of the cell sap of the root hairs can be adjusted to the salt content of the soil. Transpiration was found to be remarkably high and variable for the plants in question, and in all cases it was greater

than for a typical mesophyte. Likewise the loss of water from succulent plants was considerably in excess of that from certain specified mesophytes. Experiments in which the aerial parts were immersed showed that the plants could absorb water, the amount taken up varying with the concentration of the salt solution, and the length of time they were submerged. Absorption was more rapid when the plants were immersed in fresh water than in sea-water. Experiments showed also that the aqueous vapor of the atmosphere could be utilized.—*L. L. Harter.*

475. SAHASRABUDDHE, D. L. A preliminary note on the effect of waterings on the amount of acids secreted by the gramplant [*Cicer Arietinum*]. *Agric. Jour. India* 15: 636-639. 1920.—In previous work (*Agric. Res. Inst. Pusa Bull.* 45. 1914) it was found that the gramplant was continually producing acid during its period of growth; the acids were found to be malic and oxalic. Glandular hairs which are found in large proportion on the ovaries are acid producing. Experiments in pots, recorded in this paper, show that the greater the amount of watering the greater the acidity of the plant.—*J. J. Skinner.*

MINERAL NUTRIENTS

476. BREAIZEALE, J. F., AND LYMAN J. BRIGGS. Concentration of potassium in orthoclase solutions not a measure of its availability to wheat seedlings. *Jour. Agric. Res.* 20: 615-621. 1921.—The orthoclase used was obtained near Riverside, California. It contained 12.5 per cent potassium oxide. Aqueous extracts contained 2-9 parts per million soluble potassium. Experiments with wheat seedlings showed that the soluble potassium in aqueous solution derived from finely ground orthoclase is not absorbed to a measurable degree. The availability of potassium is not increased by addition of calcium carbonate or sulphate, carbon dioxide, or by boiling, but it is increased by oxidizing the solute with hydrochloric or nitric acid. The action of the acids is to break down the complex solute molecule.—*D. Reddick.*

477. BUCKNER, G. DAVIS. Comparative utilization of the mineral constituents in the cotyledons of bean seedlings grown in soil and in distilled water. *Jour. Agric. Res.* 20: 875-880. 1921.—A notably larger amount of reserve material was translocated from the cotyledons when the beans were grown in soil than when grown in distilled water. In either case a smaller proportion of calcium is translocated than of phosphorus or of magnesium.—*D. Reddick.*

478. DAVIS, A. R. The variability of plants grown in water cultures. *Soil Sci.* 11: 1-32. *Fig. 1-12.* 1921.—The variability of Sonora wheat grown 5 weeks in 33 replicate water culture solutions and 33 days in 50 replicate water culture solutions showed a range of 20 per cent on either side of the mean for culture weights and about 50 per cent when individual cultures were considered. Chance selections of duplicate cultures in the first series showed means varying from 1.82 to 2.55 gm.—*W. J. Robbins.*

479. ESPINO, RAFAEL B. Some aspects of the salt requirements of young rice plants. *Philippine Jour. Sci.* 16: 455-523. *Pl. 1, fig. 1-9.* 1920.—These studies deal with the mineral nutrition of lowland rice plants for the phase of their development represented by the 3-week period following germination. The experiments were carried out in spring and summer in a Baltimore greenhouse. The best results were obtained by the use of a 4-salt solution, monopotassium phosphate, calcium nitrate, magnesium sulphate, and ammonium sulphate with trace of ferric phosphate.—*Albert R. Sweetser.*

480. JONES, LINUS H., AND JOHN W. SHIVE. The influence of iron in the forms of ferric phosphate and ferrous sulfate upon the growth of wheat in a nutrient solution. *Soil Sci.* 11: 93-99. *Pl. 1, fig. 1.* 1921.—The growth of wheat in water cultures containing mineral salts, to which iron phosphate or iron sulphate containing equivalent amounts of iron were added, indicates that iron sulphate is a more available source of iron for wheat than iron phosphate.—*W. J. Robbins.*

481. LAGATU, H. Sur le rôle respectif des trois bases: potasse, chaux, magnésie, dans les plantes cultivées. [On the respective rôles of the three bases: potassium, calcium, and magnesium, in cultivated plants.] Compt. Rend. Acad. Sci. Paris 172: 129-132. 1921.—These bases are compared as to the amounts required by various agricultural plants and a diagram is constructed comparing the plants in these respects.—C. H. Farr.

482. LESAGE, PIERRE. Plantes salées et période des anomalies. [Plants grown in salty solutions and the degree of their modification.] Compt. Rend. Acad. Sci. Paris 172: 82-84. 1921.—*Lepidium sativum* was grown for 10 successive seasons in solutions containing high concentrations of salt and also in solutions of normal concentration. A comparison was made of the height of the plants and of the size and weight of the seeds. Plants grown in salt water are not so tall as those grown in fresh water, unless seeds from plants which grew in salt water are used. In the latter case the plants produced from these seeds are taller if grown in salt water than if grown in fresh water. This difference does not hold in the case of seed size and weight, in which cases the seeds produced on plants growing in salt water are always somewhat smaller and lighter than those grown in fresh water.—C. H. Farr.

483. NICOLAS, G. Contribution à l'étude du mécanisme de l'action fertilisante du soufre. [A study of the rôle of sulphur.] Compt. Rend. Acad. Sci. Paris 172: 85-87. 1921.—Flowers of sulphur were added to the soil. Beans grown in soil containing such sulphur showed an increase in the total weight of the seeds produced and in the weight of individual seeds. Very little if any starch was found stored in any part of the plant if grown without sulphur or on soil containing 100 or 300 kg. of sulphur per hectare. But abundant starch was present in both the stem and roots when plants were grown on soil containing 200 kg. of sulphur. The same relation held for peas, except that the optimum was at 300 kg. Sweet peas and lupines were also studied. The author agrees with MAZE and DEMOLON that sulphur is necessary in chlorophyll formation.—C. H. Farr.

484. SERRA, AURELIO. Applicazione dei metodi microcristallografici al riconoscimento degli elementi minerali contenuti nei vegetali. [Application of microcrystallographic methods to the determination of mineral elements in plants.] Malpighia 28: 558-560. 1920.—The author describes his method of preparing plant tissues for determining mineral crystals contained in them, and also notes the possible value of this line of investigation in the study of the soil requirements of plants.—Edith K. Cash.

485. SERRA, AURELIO. La cristallizzazione negli organi vegetali. [Crystallization in plant organs.] Malpighia 28: 555-557. 1920.—From the examination of tissues of various plants (*Ricinus*, *Oxalis*, *Citrus*, etc.) the conclusion was reached that crystallization occurs most frequently in aerial portions; and that it is furthered by processes of osmosis and assimilation and the evaporation caused by temperature and ventilation— all of the influences which tend to concentrate the solution in which crystalline molecules are deposited.—Edith K. Cash.

486. TRELEASE, SAM F. The growth of rice as related to the proportions of fertilizer salts added to soil cultures. Philippine Jour. Sci. 16: 603-627. Fig. 1-5. 1920.—The present study deals with the growth of rice plants in soil cultures to which the 3 elements, phosphorus, nitrogen, and potassium, were added in various proportions.—Albert R. Sweetser.

487. WILLAMAN, J. J. Comparative salt absorption. [Rev. of: STILES, W., and F. KIDD. (1) The influence of external concentration on the position of the equilibrium attained in the intake of salts by plant cells. Proc. Roy. Soc. London B 90: 448-470. 1919 (see Bot. Absts. 5, Entry 864); (2) The comparative rate of absorption of various salts by plant tissue. Proc. Roy. Soc. London B 90: 487-504. 1919 (see Bot. Absts. 5, Entry 851); (3) STILES, W., and W. JÖRGENSEN. On the relation of plasmolysis to the shrinkage of plant tissue in salt solutions. New Phytol. 18: 40-50. 1919 (see Bot. Absts. 3, Entry 434).] Bot. Gaz. 69: 190-191. 1920.

488. WIRTHLE, F., UND K. AMBERGER. Über Weinhefe und deren Kupfergehalt. [Copper content of dregs of wine.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 40: 365-366. 1920.

PHOTOSYNTHESIS

489. DIXON, H. H., AND H. H. POOLE. Photosynthesis and the electronic theory. *Notes Bot. School Trinity Coll. Dublin* 3: 90-104. 1920.—Negative electrons seem to be entirely responsible for the absorption of radiant energy from the ether. It is by this means that chlorophyll renders carbon dioxide and water reactive in the presence of light. The view that light energy becomes available for photosynthesis through the intermediary of the electrons is in accordance with sound reasoning and is verified by experiment.—The wave lengths that are effective in displacing the electrons of chlorophyll as indicated by its sensitizing action on the photographic plate, are the same as those that are effective in photosynthesis. Photosynthesis is apparently caused by light, the frequency of which is too low to effect the expulsion of the electrons from the chlorophyll molecule.—It seems that the atomic groups of leaf pigment enter into the reactions of photosynthesis and participate in the combinations and decompositions that ultimately lead to the formation of carbohydrates and the evolution of oxygen. Theories of photosynthesis, then, which assume that the chlorophyll itself enters into the reactions, are to be preferred to those suggestions which suppose that the reaction is accomplished externally to the chlorophyll by means of the energy absorbed and transformed by the latter.—*G. B. Rigg.*

490. MAZÉ, P. Sur le mécanisme chimique de l'assimilation du gaz carbonique par les plantes vertes. [On the chemical mechanism of the assimilation of carbon dioxide by green plants.] *Compt. Rend. Acad. Sci. Paris* 172: 173-175. 1921.—The author attributes to hydroxylamine a rôle of primary importance in the synthesis of compounds from which carbohydrates are produced. He suggests the following reactions as a possible explanation of the process of photosynthesis: $\text{NH}_2\text{OH} + \text{CO}_2 = \text{CO}_2\text{NH}_2\text{OH}$ or $\text{CO}_3\text{H}_2\text{NH}_2\text{OH}$, $2(\text{CO}_2\text{NH}_2\text{OH}) = \text{CH}_2\text{OH} + \text{CHO} + \text{HNO}_2$, or $2(\text{CO}_3\text{H}_2\text{NH}_2\text{OH}) = \text{CH}_2\text{OH} + \text{CHO} + 2\text{HNO}_2 + 2\text{H}_2\text{O}$, $\text{HNO}_2 + \text{H}_2\text{O} = \text{NH}_2\text{OH} + \text{O}_2$.—*C. H. Farr.*

METABOLISM (GENERAL)

491. AMBERGER, C. Über die Zusammensetzung des Rüböls. [Composition of rapeseed oil.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 40: 192-201. 1920.

492. BARLOT. Sur un nouveau réactif des Lactaires et des Russules à saveur âcre. [A new reaction for Lactarias and Russulas having a bitter taste.] *Compt. Rend. Acad. Sci. Paris* 172: 87-89. 1921.—Color reactions are given with methyl chloroantimoniate. They are found to be diagnostic of certain species.—*C. H. Farr.*

493. BAU, A. Die Bestimmung der Oxalsäure in Tee, Kaffee, Marmeladen, Gemüsen und Brot. [Oxalic acid determination in tea, coffee, marmalade, vegetables, and bread.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 40: 50-66. 1920.

494. BLUNCK, G. Quantitative Bestimmung physikalisch-chemischer Eigenschaften mikroskopisch-kleiner Mengen. [Quantitative determination of the physical chemical characters of microscopic masses.] *Zeitschr. Wiss. Mikrosk.* 37: 138-140. 1920.

495. BÖMER, A., UND J. BAUMANN. Beiträge zur Kenntnis der Glyceride der Fette und Öle. IX. Die Glyceride des Cocosfettes. [Glycerides of cocoanut fat.] *Zeitschr. Untersuch. Nahrungs- u. Genussmittel* 40: 97-151. 1920.—Considerable caprylic acid was found but no caproic or caprinic. Besides oleic acid there are small amounts of palmitic and stearic acids. The principal glycerides of the saturated fatty acids of cocoanut fat consist of myristin compounds.—*H. G. Barbour.*

496. LINOSSIER, G. Les vitamines et les champignons. [Vitamines and fungi.] Compt. Rend. Soc. Biol. 83: 346-349. 1920.—Certain fungi, *Oidium lactis*, *Aspergillus niger*, and *Penicillium glaucum*, are able to grow in pure culture in media lacking vitamines, but containing the necessary mineral nutrients, an ammonium salt, and glucose. Only on greatly reducing the nutrients does the 1st and sometimes the 2nd show feebler growth as compared with similar dilute solutions to which has been added a drop or so of sap or orange juice. Other fungi, like beer yeast and *Mycoderma vini*, easily show a marked difference when the vitamines are added. The fungi of the 1st group excrete into the culture media vitamines which stimulate the growth when added to the cultures of the fungi of the 2nd group. Yeast with vitamines exhausted all sugar of the medium in 11 days, without vitamines in 27 days. The weight of the fungus was respectively 10 and 6 mg. In another case in equal lengths of time the amount of sugar consumed was 1.6 and 1.16 gm. and the weight of fungus 16 and 8 mg., respectively for cultures with and without added vitamines.—E. A. Bessey.

497. MANNICH, C., UND K. LENZ. Über eine Methode zur polarimetrischen Bestimmung der Stärke in Calciumchloridlösung. [Polarimetric determination of starch in CaCl_2 solution.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 1-11. 1920.

498. MITRA, S. K. Seasonal changes and translocation of carbohydrate materials in fruit spurs and two-year-old seedlings of apple. Ohio Jour. Sci. 21: 89-103. 1921.—Analyses for glucose, maltose, sucrose, total sugars, and readily hydrolyzed polysaccharides (called starch), as well as determinations of hydrogen-ion concentration, were made on samples of 1 year old stems, 2 year old stems, and roots of apple seedlings, and on apple spurs. The samples were collected twice a month during a year. No distinction is indicated between non-bearing spurs and spurs bearing fruit. The data are given in terms of dry weight. A correlation is pointed out between carbohydrate changes and hydrogen-ion concentration as this is known to favor the action of diastase or maltase.—H. D. Hooker, Jr.

499. PLAHL, LME. W. Zum Nachweis der Oxalate in Pflanzengeweiben. [Identification of oxalates in plant tissues.] Zeitschr. Wiss. Mikrosk. 37: 130-135. 1920.—The method depends on precipitation with AgNO_3 in the presence of HNO_3 , other organic acids remaining in solution.—H. G. Barbour.

500. SAUVAGEAU, C. Sur la membrane de quelques algues floridées et sur la gélation de l'hydrosol gélosique. [On the membrane of certain red algae and the gelation of the gelatinous hydrosol.] Compt. Rend. Acad. Sci. Paris 171: 606-609. 1920.—Two types of indigenous red algae are used commercially as sources of agar and similar substances. The *Chondrus* type has an envelope of pecto-cellulose, the pectic portion upon gelation yielding the mucilage. The *Gelidium* type contains in addition a substance staining violet in iodine to which the name amyloid is applied. The changes taking place in this amyloid during cooking and boiling are described. This substance is found in species of *Gelidium*, *Gracilaria*, *Laurencia*, *Cystoclonium*, *Pterocladia*, *Ahnfeldia*, and *Porphyra*.—C. H. Farr.

METABOLISM (NITROGEN RELATIONS)

501. GUGGENHEIM, M. Die biogenen Amine und ihre Bedeutung für die Physiologie und Pathologie des pflanzlichen und tierischen Stoffwechsels. [The biogenous amines and their significance for the physiology and pathology of plant and animal metabolism.] Monographien aus dem Gesamtgebiet der Physiologie der Pflanzen und der Tiere 3: 1-376. Julius Springer: Berlin, 1920.—The point of view of the author is somewhat indicated by the fact that he recognizes the term 'biogenous amines' to represent no definitive physiological or chemical group, this name being considered preferable, however, to proteinogenous amines—since the latter implies a direct and invariable relation to the proteins. After a preliminary general account the author gives brief characterizations of the various larger groups. The substances included are treated under 9 topical headings, as follows: Alkylamines (methylamine, etc.), alkanol-

amines (cholin, etc.), neurin group, diamines (lysin, etc.), guanidin compounds, imidazole (histidin), betaines and α -amino acids, the phenylalkyl- and phenylalkanolamines (ephedrin, adrenalin, etc.), and indole thylamine. Under each substance there is a brief account of its discovery, occurrence and origin, composition, methods of preparation, and, so far as possible, its biological significance. The author regards the further study of these bodies as most important, offering such possibilities as rational explanations of vitamins, increased light on phenomena of virulence and immunity, and rapidly advancing knowledge in the field of internal secretions.—*B. M. Dugger.*

502. MANNICH, C., UND G. WIPPERLING. Die Trennung und quantitative Bestimmung von Protein und Nichtprotein-Stickstoff durch Ultrafiltration. [Separation and quantitative determination of protein and non-protein nitrogen by ultrafiltration.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 40: 12-20. 1920.—Beans, hops, carrots, potatoes, cottonseed, and wheat were analyzed. While the results varied considerably from parallel determinations by the accepted method, it is claimed that ultrafiltration will prove useful.—*H. G. Barbour.*

503. STROWD, W. H. The forms of nitrogen in soy-bean nodules. Soil Sci. 11: 123-130. 1921.—An examination of 100 gr. of soybean nodules failed to show the cyanide radical by a method sensitive to 0.01 mg. of hydrocyanic acid. Of the total nitrogen in nodules 30-40 per cent is water-soluble and 40-55 per cent soluble in 10 per cent salt or dilute alkali. About 3 per cent of the water-soluble nitrogen was protein or proteose. No globulin and only a small amount of albumin was found. Primary amino nitrogen formed 16 per cent of the protein-free water-soluble nitrogen, and amide nitrogen 19.3 per cent. Over 60 per cent of the total water-soluble nitrogen was precipitated by phospho-tungstic acid.—*W. J. Robbins.*

504. WOODARD, J. Tyrosin in fungi. [Rev. of: DODGE, C. W. Tyrosin in the fungi: chemistry and methods of studying the tyrosinase reaction. Ann. Missouri Bot. Gard. 6: 71-92. 1919 (see Bot. Absts. 4, Entry 1446).] Bot. Gaz. 69: 191. 1920.

METABOLISM (ENZYMES, FERMENTATION)

505. ANONYMOUS. [Rev. of: EFFRONT, JEAN. Biochemical catalysts in life and industry. Proteolytic enzymes. xii + 752 p. John Wiley & Sons: New York; Chapman & Hall: London, 1917.] Sci. Prog. [London] 14: 347-348. 1919.

506. BRIDEL, M., ET R. ARNOLD. Sur l'emploi de divers agents de précipitation dans la préparation de l'émulsion des amandes. [The use of different precipitation agents in the preparation of the emulsin of almonds.] Jour. Pharm. et Chimie 23: 161-168. 1921.—Emulsin of almonds is generally prepared by Hérissé's process, that is, macerating the almonds with water, removing the casein by means of acetic acid, and precipitating the ferment by strong alcohol. Thus a mixture of ferments is obtained which consists of emulsin proper or β glucosidase, lactase, gentiobiase, cellobiase, melibiase, manninobiase, β galactosides, and a small amount of invertin. When alcohol is replaced by methyl alcohol or acetone and when too long a contact of the precipitant with the ferments is avoided, a ferment is obtained which possesses practically all the properties of ordinary emulsin. Furthermore, when the ferment is allowed to remain in contact with the precipitation liquid for too long a time an emulsin is obtained which is devoid of certain other ferments.—*H. Engelhardt.*

507. HARTER, L. L. Amylase of *Rhizopus tritici*, with a consideration of its secretion and action. Jour. Agric. Res. 20: 761-786. 1921.—A vigorous starch-splitting enzyme is secreted by *R. tritici*. The enzyme from old mycelium is less active than that from young. Storage of the dried mycelium for several months at from 9° to 35°C. does not lessen its power of digestion, but at 60° it becomes gradually less. The optimum temperature for the digestion of starch is about 45°C. The hydrolytic capacity is destroyed in 100 hours at 60°C. Glucose retards the hydrolysis of starch paste, although the quantity of glucose does not influence the results. With a constant amount of enzyme powder hydrolysis increases with the increase in volume

of the solution up to a certain point, and then decreases. An end point in the hydrolysis is not reached without altering the equilibrium of the system, as by changing the temperature and diluting the solution. If judged by the iodine test an end point was obtained, but a quantitative determination of the reducing sugars did not account for all of the starch. When the enzyme is in suspension some of it is removed by filtering through Whatman chemically-prepared filter paper. Using equal weights of enzyme powder it was found that mycelium grown at 9° hydrolyzed about 4 times as much starch in the same length of time as mycelium grown at 40°C. The enzyme power of mycelium grown at 29°C. was intermediate between the 2. At these 3 temperatures the best growth of the fungus was made at 29° and the poorest at 9°C. There is "quantitative regulation" of the enzyme. The hydrolyzing power of mycelium is much greater when starch alone is used as a source of carbon than when glucose alone, or in combination with starch, was employed. However, if grown on sweet potato bouillon, which contains both starch and sugars, a unit weight of the mycelium will hydrolyze more starch than when grown on any of the other combinations. The vigor of growth of the fungus was correlated with the hydrolytic power of the enzyme powder. The results seem to indicate that it is not so much the source of the carbohydrate which influences the quantitative production of the enzyme as it is the influence which it has on the growth of the fungus on which the secretion of the enzyme depends.—*L. M. Massey.*

508. LEONCINI, G. Di un'ossidasia vegetale agente sulla florizina. [An oxidase of vegetable origin acting upon phloridzin.] *Staz. Sperim. Agrarie Ital.* 53: 138-145. 1920.—When wheat kernels are allowed to remain in a solution of phloridzin at a temperature of 15-20°C. these soon become surrounded by a zone of yellow liquid. This zone extends to include the whole solution if the seed are allowed to remain for a few hours longer. The same phenomenon takes place when the seed have previously been sterilized with a 2 per cent CuSO_4 solution, or with formaldehyde. The seed of various other Graminaceae were tried and found to give negative results. The flour of the *Triticum* seed also gave negative results, while the bran was found to give positive results. The action was stopped when the seed were heated to 100°C. for 5 minutes or if the seed were placed in a system from which all the oxygen had been removed by means of a mercury pump. Sterile apple pulp gave a similar result. In a solution of tyrosine, however, no change took place. Beet pulp acted on both solutions, although its oxidizing power upon phloridzin is greater than upon tyrosine. The author concludes from these findings that some plants contain an oxidase capable of oxidizing phloridzin to a yellow substance probably of a quinoid structure, a change which permits the assumption that phloridzin behaves as a true chromogen.—*A. Bonazzi.*

509. MASON, T. G. On the inhibition of the invertase in the sap of *Galanthus nivalis*. *Notes Bot. School Trinity Coll. Dublin* 3: 105-119. 1920.—Since the depression of the freezing point of a sucrose solution is approximately doubled by complete inversion of the sucrose, it seemed probable that an approximate estimate of the sucrose content of the sap of leaves could be obtained by observing the increase in the depression of the freezing point after storage at a suitable temperature. It was found, however, that other factors (one or more) present in extracted sap tended to limit the activity of the enzyme. Changes of a nature not yet understood (possibly H-ion concentration) occurring in extracted juices lead to a clumping of the colloids. It is suggested that the enzyme may be inactivated by adsorption on the coagulated colloids. The experiments performed suggest that in cases of sucrose storage in living leaves the activity of the enzyme tending to invert it is regulated by reversible precipitation of the colloid (anti-enzyme).—*G. B. Rigg.*

METABOLISM (RESPIRATION, AERATION)

510. ROCKWELL, G. E. A study of the gaseous requirements for the growth of various bacteria. *Jour. Infect. Diseases* 28: 352-356. *Fig. 1.* 1921.—The author finds that the growth of some bacteria ordinarily considered to be of the aerobic and of the facultative anaerobic group is in some way favored by CO_2 . Strict anaerobes cannot use even traces of atmospheric oxygen.—*Selman A. Waksman.*

ORGANISM AS A WHOLE

511. BEAU, CLOVIS. Sur le rôle trophique des endophytes d'Orchidées. [The nutritive rôle of endophytes of orchids.] Compt. Rend. Acad. Sci. Paris 171: 675-677. 1920.—The small amount of food stored in the very minute seeds of orchids indicates that the mycelium of the endophyte supplies necessary foods from the surrounding medium at early stages of development. Experiments were performed with germinating orchid seed in Petri dishes. A block of nutritive gelatin was introduced and the culture infected with the endophytic mycorrhiza. The hyphae were positively chemotropic towards gelatin and a connection is soon established by the hyphae between the gelatin and the seed. If these hyphae are destroyed the seed cease developing even though other hyphae may connect the seeds with distilled water. This may explain why some orchids may even reach the blooming stage in an aetiolated condition with little or no chlorophyll or light.—C. H. Farr.

512. CHURCH, A. H. The building of an autotrophic flagellate. Bot. Mem. [Oxford] 1. 27 p. 1919.—The author discusses the evolution of an autotrophic flagellate of pelagic plankton comparable with that from which the ancestral forms of the Phaeophyceae may have been derived. Evolution is considered and briefly discussed with reference to the following factors: Ionic relations, the external source of energy, photosynthesis, proteid-synthesis, balance of carbohydrate synthesis and proteid synthesis, growth, day and night, surface-tension, contractibility, differentiation of plasmatic tracts, polarity, the flagellum, binary fission, failure and death, holozoic nutrition, flagellar nutrition, plasmogamy and the origin of sexual fusion, differentiation of flagella, comparative dimensions, encystment, and formation of the cell wall.—J. S. Cooley.

513. JONES, H. A. Physiological study of maple seeds. Bot. Gaz. 69: 127-152. 2 fig. 1920.—This is a study of the viability of the seed of the sugar maple (*Acer saccharum*) and the river maple (*Acer saccharinum*). The sugar maple seed mature in the fall, contain much fat and protein but little carbohydrate, and pass through a period of after-ripening before germination. The river maple seed mature in the spring, contain much starch but little fat and protein, and must germinate almost at once if at all.—The seed of the river maple lose their viability when the water content is reduced to 30-34 per cent. Temperature plays but little part in determining the critical point of water loss. The seed may be kept in a vigorous viable condition for a considerable time if stored over water at 0°C. Respiratory activity in the desiccating seed at 25°C. first decreases slightly, then rises to a maximum, then gradually falls to zero as desiccation progresses. After a slight initial increase, catalase activity gradually decreases in the desiccating seed, but it increases enormously during the early stages of germination. A gradual decrease in peroxidase activity accompanies desiccation.—Sugar maple seed after-ripen best at temperatures near 5°C., with a good supply of oxygen and moisture, and show at that time a considerable increase in free-reducing sugars. Catalase activity increases greatly with after-ripening and germination, and there is also a slight increase in peroxidase activity. The hypocotyl as well as the entire embryo has a distinct alkaline reaction in both dormant and after-ripened seed. Fully after-ripened seed will remain in this condition for a long time if kept moist at -5°C.—H. C. Cowles.

514. SHULL, C. A. Susceptibility gradients. [Rev. of: CHILD, C. M. (1) Axial susceptibility gradients in algae. Bot. Gaz. 62: 89-114. 1916; (2) Further observations on axial susceptibility gradients in algae. Biol. Bull. 31: 419-440. 1916; (3) Susceptibility gradients in the hairs of certain marine algae. Biol. Bull. 32: 75-92. 1917; (4) Experimental alteration of the axial gradient in the alga *Griffithsia Bornetiana*. Biol. Bull. 32: 213-233. 1917; (5) Demonstration of the axial gradients by means of potassium permanganate. Biol. Bull. 36: 133-147. 1919.] Bot. Gaz. 69: 187-188. 1920.

515. WALKER, LEVA B. Biology and culture of the higher fungi. [Rev. of: BOYER, G. Études sur la biologie et la culture des champignons supérieurs. 116 p., 4 pl., 20 fig. Bordeaux, 1918 (see Bot. Absts. 5, Entry 1931).] Bot. Gaz. 69: 188-189. 1920.

GROWTH, DEVELOPMENT, REPRODUCTION

516. CROCKER, WILLIAM. Conditions affecting flower development. [Rev. of: (1) KLEBS, GEORGE. Ueber die Blütenbildung von *Sempervivum*. (Flower formation in *Sempervivum*.) *Flora* 11-12: 128-151. 5 fig. 1918 (see Bot. Absts. 2, Entry 601); (2) FISCHER, H. Zur Frage der Kohlensäure-Ernährung der Pflanzen. (Carbonic acid nutrition of plants.) *Gartenflora* 65: 232-237. 1916; (3) KRAUS, E. J., AND H. R. KRAYBILL. Vegetation and reproduction with special reference to the tomato. *Oregon Agric. Exp. Sta. Bull.* 149. 90 p. 1918 (see Bot. Absts. 1, Entry 1402).] *Bot. Gaz.* 67: 445-446. 1919.

517. MITSCHERLICH, E. A. Ein Beitrag zum Gesetze des Pflanzenwachstums. [The law of plant growth.] *Fühling's Landw. Zeitg.* 68: 130-133. 1919.—The author calls attention to a general phenomenon of growth in organisms, viz., slow initial growth, a period of rapid growth, and a period of slow growth as maturity sets in.—He reports determinations of dry weight produced during the grand period of growth in cultures of peas and mustard. Determinations were made at quasi-definite stages of growth; for example, the appearance of the 1st tendril-bearing leaves, and of 4th pair of leaves (in peas). The stages of growth did not represent the same time interval in all cases.—Values closely approximating the observed were given by the equations,

$$\begin{aligned} \text{for peas, } \log. \left(1.345 - \sqrt[15]{y} \right) &= .1286 - .24x; \\ \text{for mustard, } \log. \left(1.26 - \sqrt[15]{y} \right) &= .1 - .4x; \end{aligned}$$

in which y = the average dry weight of plants at the x th growth period. — H. S. Reed.

518. MITSCHERLICH, E. A. Zum Gesetze des Pflanzenwachstums. [The laws of plant growth.] *Fühling's Landw. Zeitg.* 68: 419-426. 1919.—This is a rejoinder to RIPPPEL's discussion and criticisms (see Bot. Absts. 9, Entry 519).—The rate of growth of organisms is expressed by the differential equation,

$$\frac{dy}{dx} = cy(A - y),$$

in which y = the mass of the plant at time x , A = the final (limiting) value of y , and c = a constant. Various methods of integration give equations which express the value of y for any positive value of x . ROBERTSON's equation,

$$\log \frac{x}{A - x} = K(t - t_1),$$

gives, for small values of x , values which are larger than the observed, while Mitscherlich's equation,

$$\log \left(\sqrt[n]{A} - \sqrt[n]{y} \right) = \log \sqrt[n]{A} - c \cdot x,$$

gives lower values. Somewhat better agreement may be obtained in the case of plant growth if the weight of the seed planted be deducted. Rippel's theory that during the first stage of growth there is some sort of a retarding factor is contradicted. The 2 equations are examined for their ability to express the growth of gourd fruits, *Vicia Faba* roots, peas, and mustard plants.—The somewhat polemical discussion concludes with the statement that Rippel's criticisms in no way invalidate Mitscherlich's previous statements.—H. S. Reed.

519. RIPPPEL, A. Die Wachstumskurve der Pflanzen und ihre mathematische Behandlung durch Robertson und Mitscherlich. [The growth curves of plants and their mathematical treatment according to Robertson and Mitscherlich.] *Fühling's Landw. Zeitg.* 68: 201-214. 1919.—This is a critical examination of the applicability of formulas proposed by ROBERTSON and by MITSCHERLICH (see Bot. Absts. 9, Entry 517, 518) to the growth of plants. It contains citations to cognate studies, and deals with the rate of growth of root zones, of seedling

leaves, and of flower stalks; the evolution of CO_2 in alcoholic fermentation; and water absorption by plants. There is a discussion of the formula of autocatalysis presented by Robertson,

$$\log \frac{x}{A-x} = K(t-t_1),$$

where x = quantity of substance formed at time t , A = final (limiting) value of x , K is a constant of the reaction, and t_1 is the time at which $x = \frac{A}{2}$. Also, there is consideration of the formula presented by Mitscherlich,

$$\log \left(\sqrt[n]{A} - \sqrt[n]{y} \right) = \log \sqrt[n]{A} - c \cdot x,$$

where y = amount of substance formed at stage x , A = final (limiting) value of y , and n = number of stages. The author concludes that Robertson's formula gives more nearly correct representation of physiological processes than that of Mitscherlich. He discusses sources of error of determinations and necessary precautions. The original should be consulted.—*H. S. Reed.*

MOVEMENTS OF GROWTH AND TURGOR CHANGES

520. ANONYMOUS. [Rev. of: LOEB, JACQUES. Forced movements, tropisms, and animal conduct. 209 p., 42 fig. J. B. Lippincott & Co.: London and Philadelphia, 1918.] *Sci. Prog.* [London] 14: 167-168. 1919.

521. FYSON, P. F., and K. VENKATARAMAN. Note on curvature of cut stems of *Bryophyllum calycinum*. *Jour. Indian Bot.* 1: 337-343. Pl. 2. 1920.—This paper is inspired by J. LOEB and is an answer to various papers by him on growth in *Bryophyllum calycinum*. [See Bot. Absts. 1, Entries 68, 273, 736; 2, Entries 181, 858, 859.] The authors conclude from experiments conducted in Madras on this plant: That curvature of horizontally supported stems is due to the weight of the stem, and not to the formation of geotropic hormones by any leaves that may remain attached; that root formation by stems bears no apparent relation to the presence or absence of leaves; that the formation of roots from the notches of leaves depends on moisture supply, and not on leaf position; that "neither the stem itself, nor the opposite bud, nor the axillary bud, exert any absolute inhibition on the development of the marginal notches, and probably affect it very little"; that root pressure or a developing terminal bud exert no influence on the formation of roots from the notches of attached leaves; and finally that "our observations confirm those of KLEBS on the effect of an excess of water on adventitious root formation."—*Winfield Dudgeon.*

522. PHILLIPS, THOMAS G. Chemical and physical changes during geotropic response. *Bot. Gaz.* 69: 168-178. 1920.—Definite moisture changes accompany geotropic bending in corn nodes. During the early stages of bending there is a greater percentage of moisture in the concave flank. When the process has developed, the percentage of water is greater in the convex flank. Although the titratable acidity is greater in the convex flank, the differences are very slight. The results on hydrogen-ion concentration, although uniform in direction, are not numerous enough to serve as a basis for conclusions. It is impossible, with the data obtained, to correlate the geotropic bending of etiolated *Vicia Faba* shoots with differences in moisture, titratable acidity, hydrogen-ion concentration, catalase activity, or the distribution of sugars and nitrogen-containing substances.—*Thomas G. Phillips.*

523. RICHOME, H. L'orientation des rameaux dans l'espace. [The orientation of stems.] *Compt. Rend. Acad. Sci. Paris* 171: 734-735. 1920.—This is an addition to a recent article in an earlier number of the same volume in which the author attributes the weight which influences negative geotropism to the distribution of water in the plant. [See also Bot. Absts. 8, Entry 663.]—*C. H. Farr.*

GERMINATION, RENEWAL OF ACTIVITY

524. WELTON, F. A. Longevity of seeds. Monthly Bull. Ohio Agric. Exp. Sta. 6: 18-24. 1921.—Brief reference is made to work done by VILMORIN, HABERLANDT, and SIFTON. Factors affecting the longevity of seed are discussed and reference is made to hard seed. The report in tabular form shows the per cent of viability of the seed of cereals, other grasses, and a few vegetables grown on the station farm at Wooster, Ohio, extending over a period of 12 years.—R. C. Thomas.

TEMPERATURE RELATIONS

525. WALSTER, H. L. Formative effect of high and low temperatures upon the growth of barley: A chemical correlation. Bot. Gaz. 69: 97-126. 18 fig. 1920.—The usual view that the optimum germination temperature is that which most quickly permits the emergence of the radicle and plumule is not accepted, except for the germination function taken by itself. A high temperature and a high nitrogen supply at the time of germination so shift the equilibrium toward excessive vegetation as to prevent the normal tendency toward reproduction. The tendency toward excessive vegetation inaugurated by an excess of nitrate nitrogen accompanying germination and early development at high temperatures cannot be counteracted by the addition of phosphorus or potassium salts. A chemical analysis of the leaf reveals (1) that "high heat supply + high nitrogen supply in nutrient solution = high soluble nitrogen in leaf + low soluble carbohydrate = excessive vegetation and little culm formation," and (2) that "low heat supply + high nitrogen supply in nutrient solution = low soluble nitrogen in leaf + high soluble carbohydrate = normal vegetation and normal culm formation."—H. C. Cowles.

RADIANT ENERGY RELATIONS

526. WURMSER, RENÉ. L'action des radiations de différentes longueurs d'onde sur l'assimilation chlorophyllienne. [The effect of rays of different wave length on chlorophyll assimilation.] Compt. Rend. Acad. Sci. Paris 171: 820-822. 1920.—The work is carried out with a new method based on the principles outlined by LOEB and OSTERHOUT. Phenolphthalein was used as an indicator, and experiments were performed with *Ulva lactuca* and *Rhodomenia palmata*. The rate of assimilation in the red, green, and blue respectively was found to be 100, 24, and 80 for *Ulva*, and 100, 50, and 18 for *Rhodomenia*. It thus appears that the red pigment of the Rhodophyceae makes possible the use of green light in photosynthesis.—C. H. Farr.

527. WURMSER, RENÉ. L'action de la lumière sur la chlorophylle colloïdale en présence de stabilisateurs. [The action of light upon colloidal chlorophyll in the presence of stabilizers.] Compt. Rend. Soc. Biol. 83: 437-438. 1920.—While chlorophyll is destroyed by light very rapidly when in solution, yet in the plant it is destroyed slowly. By mixing a solution of chlorophyll prepared by the method of Willstätter and Stoll with various colloids this destructive action of light has been greatly retarded, a gelatin solution being the most effective of those tried (gelatin, egg albumin, gum arabic, and starch paste).—E. A. Bessey.

TOXIC AGENTS

528. MÈGE, E. Action de la chloropicrine sur la faculté germinative des graines. [The effect of chloropicrine on the germinating ability of seeds.] Compt. Rend. Acad. Sci. Paris 172: 170-173. 1921.—Chloropicrine is found to interfere with the germination of some seeds while not affecting others at ordinary concentrations. Flax is not affected at 15 cc. per cubic meter, but is affected at 50 cc. concentration. Legumes in general are resistant, whereas grasses are sensitive to the gas. About 15-20 cc. per cubic meter is recommended as an insecticide, being used for a period of 24 hours without much injury to any seed.—C. H. Farr.

529. VILLEDIEU, M. ET MME. De la non-toxicité du cuivre pour les moisissures en général et pour le mildou en particulier. [The non-toxicity of copper for molds in general and for mildews in particular.] Compt. Rend. Acad. Sci. Paris 171: 737-739. 1920.—Most ordinary molds may be cultivated in 1, 2, 5, or 10 per cent solutions of cuproammonium citrate, a salt which is slightly acid, very soluble in water, and contains 15 per cent metallic copper. *Penicillium* lives well in nutritive agar saturated with this salt. The toxic action of copper sulphate is found to be due entirely to the free sulphuric acid produced in solution. *Phytophthora infestans* will grow in solutions of copper ammonium citrate up to a strength of at least 0.1 per cent.—C. H. Farr.

530. WIELER, A. Rauchscha den bei Kokereien. [Smoke injury from coke ovens.] Jahresher. Ver. Angew. Bot. 16: 64-76. 1918.—The author finds considerable injury from fumes of coke ovens within a radius of a kilometer, extent of injury varying with distance from ovens, direction from ovens, intervening barriers, etc. Different plants vary greatly with regard to their susceptibility to injury—legumes, roses, and potatoes suffering more than other crops. The character of the injury is very different from that of the acid injuries produced by sulphur fumes, and the writer does not believe that sulphur is responsible in this case. He indicates rather that some basic compounds of the anthracene-oil fraction and possibly ammonia are the toxic substances, although this phase needs further investigation. No method of prevention has been found.—P. J. Anderson.

ELECTRICITY AND MECHANICAL AGENTS

531. PECK, J. L. Les différences de potential en biologie. [Differences of potential in biology.] Compt. Rend. Soc. Biol. 83: 282-283. 1920.—A growing carrot plant removed from the soil and placed with its roots in water up to the middle showed a difference in potential between leaves and water of about 4 volts. Under the influence of ultra-violet rays this increased to 8 volts and became zero on adding to the water 10 drops of HNO_3 per 100 gm. water. Further experiments with animal tissues showed a difference in potential between muscles and blood, or between muscles and water, into which they were placed. These were increased by ultra-violet light or some toxins. The absorption of water by the muscles shows a close relation to the potential differences between the water and muscle.—E. A. Bessey.

SOIL SCIENCE

J. J. SKINNER, *Editor*

F. M. SCHERTZ, *Assistant Editor*

(See also in this issue Entries 11, 25, 27, 32, 34, 57, 100, 107, 112, 203, 208, 402, 437, 452, 480, 574)

532. AIYER, A. R. PADMANABHA, AND D. V. BAL. The chemical and biological aspect of Bhata soil of Chandkhuri experimental farm, Central Provinces. Agric. Jour. India 15: 644-649. Pl. 46-50. 1920.—The Bhata or lateritic soils of Central Provinces were found to be poor on account of the large per cent of coarse material they contained and to a lack of phosphorus. The addition of phosphorus improved the soil for the growth of leguminous crops. The soil has good ammonifying and nitrifying powers. When cake was applied and inoculated with emulsion of a rich black cotton soil, good growth was secured.—J. J. Skinner.

533. ALBRECHT, W. A. Bat guano and its fertilizing value. Missouri Agric. Exp. Sta. Bull. 180. 15 p. 1921.—Chemical analyses of bat guano and pot and field experiments with this material as a fertilizer are reported. The material, which is commonly found in caves in Missouri, is said to have considerable value as a fertilizer, its nitrogen content varying from 0.31 to 10.44 per cent, phosphoric acid 2.5 to 7.9 per cent, and potash 0.36 to 1.9 per cent. In ammonification tests fresh bat guano produced as much ammonia and more nitrates than

tankage but did not equal dried blood. In pot cultures bat guano gave better results than dried blood, tankage, or ammonium sulphate, and in field tests with oats it also proved superior to ammonium sulphate. Because of its relatively high nitrogen content and because of its light weight when dry it is recommended primarily for mixture with other fertilizers.—*L. J. Stadler.*

534. BAGULEY, A. Building up the fertility of the soil. Jour. Dept. Agric. Union of South Africa 1: 755-759. 1920.—A general discussion of improving soil fertility by means of humus, lime, and fertilizers.—*J. J. Skinner.*

535. BOUYOUKOS, GEORGE B. A new classification of soil moisture. Soil Sci. 11: 33-47. 1921.—On the basis of freezing point determination of soil of various types and water contents and determinations of the per cent of water which freezes in soils at different temperatures as determined by the use of the dilatometer, the soil water is classified as gravitational, free (water which freezes for the first time at a supercooling of $-1.5^{\circ}\text{C}.$), capillary adsorbed (water which freezes at the supercooling of $-4^{\circ}\text{C}.$), and combined water, which does not freeze even at $-78^{\circ}\text{C}.$ The capillary-adsorbed and combined water are called unfree.—*W. J. Robbins.*

536. BOUYOUKOS, GEORGE B. The concentration of the soil solution around the soil particles. Soil Sci. 11: 131-138. 1921.—The concentration of the soil solution in intimate contact with the surface of the soil particles is less than that of the mass of the soil solution. This is indicated (1) by the diminution of the freezing-point lowerings of soils by successive freezing and thawing; (2) by the liberation of unfree water from soils, by successive freezing and thawing; (3) by the abnormally greater increase in the freezing-point depression of soils as the moisture content decreases; and (4) the equality in the freezing-point lowering between the supernatant liquid and the soil which bathes it.—*W. J. Robbins.*

537. DAVIS, R. O. E. Atmospheric nitrogen for fertilizer. U. S. Dept. Agric. Yearbook 1919: 115-123. 1920.—The sources of natural nitrogen fertilizer supply are shown to be inadequate to meet the increased future demands. The desirability of a method of utilizing the atmospheric nitrogen was emphasized. A discussion of the practicality of 5 principal methods for conversion of atmospheric nitrogen into available fertilizer compounds showed that the Haber and the cyanamid processes were the only ones adapted to use in the U. S. A. at present.—*C. J. Shirk.*

538. ESPE, KNUTE, AND LAWRENCE E. LINDLEY. Soil survey of Hamilton County, Iowa. Advance Sheets Field Operations Bur. Soils, U. S. Dept. Agric. 1917: 5-30. *Fig. 1 and map (colored).* 1920.—Hamilton County is situated in the north central part of Iowa in a prairie region. The prevailing flat topography is intercepted by the precipitous slopes of Boone River and by morainic ridges. The general elevation is between 1,100 and 1,200 feet above sea level.—Drainage within the county as a whole is imperfect.—The mean annual precipitation is 34.55 inches. The normal growing season is 146 days.—Agriculture, which is the principal industry in Hamilton County, consists mainly in the production of corn, small grain, and hay combined with the raising and feeding of hogs and other live stock. Corn is the main crop.—The soils of the county are glacial in origin, in appearance they are predominantly dark. Large poorly drained areas occur. In great part the soils of the county are calcareous, alluvial soils are inextensive. Eroded strips bordering the stream valleys are characterized by light brown to gray surface soils. Such areas are for the most part forested and originally were all forested. Peat and muck occur in shallow and basin-like areas representing former ponds or lakes. Small areas of alkaline soils occur in the swales, ponds, or sloughs that have recently been drained. Corn is most susceptible to injury from the alkali. Drainage is the chief factor in correcting the alkaline condition.—Improved land constitutes 90-95 per cent of the County. The average size of farms is about 179 acres.—*F. B. Howe.*

539. GEIB, W. J., CLARENCE LOUNSBURY, AND MARTIN O. TOSTERUD. Soil survey of Waupaca County, Wisconsin. Advance Sheets Field Operations Bur. Soils, U. S. Dept. Agric.

1917: 5-50. *Fig. 1 and map (colored)*. 1920.—Waupaca County is situated in the east central part of Wisconsin in a glaciated region. The topography varies from level to rolling or hilly, the ruling elevation of the county being 848 feet above sea level.—The county lies within the drainage basin of Wolf River. Numerous marsh areas and lakes are found in the county.—The mean annual precipitation is 31.62 inches, a large proportion of which occurs during the growing season, which averages 129 days. Early frosts are frequent on the marsh areas.—Agriculture consists in general farming, potatoes are an important crop on the sandy soils.—Large areas of unclaimed peat are found in the county. The depth of the peat varies from a shallow phase of 18 inches or less to 3 feet or more below the surface. Vegetation on peat consists of coarse marsh grasses, sedges, and sphagnum moss on open marshes, with willow, alder, some poplar, and tamarack in timbered tracts. Peat when reclaimed is adapted for potatoes, cabbage, celery, onions, and other garden truck. The Gloucester soils, one of the most important and extensive series in Waupaca County, especially in the western half, are derived through glacial action from crystalline rocks, and are mainly sandy in texture. The original forest growth was chiefly hardwoods, including maple, oak, birch, and some elm, with varying amounts of white and Norway pine. On the Gloucester sand the original timber growth consisted of scrubby oak and some white pine. The Kewaunee series and Superior series are partly lacustrine in origin; they are characterized by heavy clay subsoils. The original timber growth on these soils consisted of maple, oak, elm, hickory, some walnut, and varying amounts of pine. The Whitman series and the Poygan series are poorly drained upland soils which in their native state supported a growth of elm, ash, willow and alder, together with coarse grasses and other moisture-loving vegetation. Alluvial soils deposited as outwash plains consist of the Plainfield series and Merrimac series. Other alluvial soils such as the Genesee series and the Dunning series are subject to overflow where they occur adjacent to stream courses. The average size of farms is approximately 110 acres.—*F. B. Howe*.

540. GERLACH. *Die Kohlensäureernährung der Pflanzen und der Stalldünger*. [Carbonic acid nutrition of plants and stable manure.] *Mitteil. Deutsch. Landw. Ges.* 36:147-150. 1921.—This is a general review of the controversy between BORNEMANN and LEMMERMAN in which the author brings forth data from previous experiments to show that Bornemann greatly overrated the effect of carbonic acid produced by the decay of stable and green manures. Gerlach finds that the carbonic acid thus produced has no effect on crop yields. [See also *Bot. Absts.* 8, Entry 12, 32.]—*A. J. Pieters*.

541. HARRISON, J. B., AND C. B. W. ANDERSON. *The genesis of a fertile soil*. *West Indian Bull* 18: 77-98. 1920.—This paper comprises a study of the origin and development of the fertile sugar-cane soils of the island of Barbados, West Indies. Historical and analytical data are given, and the theory of the origin of the soils is discussed.—*J. S. Dash*.

542. HUDELSON, R. R. *Keeping soils productive*. *Missouri Agric. Exp. Sta. Circ.* 102. 24p. 1921.—A brief popular discussion of the essentials in the maintenance of soil fertility.—*L. J. Stadler*.

543. HUDIG, J., EN W. STURM. *Het meten van waterstof-ionenconcentraties en boden-extracten en bodensuspensies*. [Measurement of hydrogen-ion concentrations in soil extracts and soil suspensions.] *Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta.* 25: 85-127. 1919.—With the V-electrode no reliable measurements of soil extracts from sand-containing peat could be made, as the potential constantly changes. Through proper disinfection it was demonstrated that this could not be attributed to action of soil bacteria. A new electrode was constructed through which hydrogen could be conducted, the soil and liquid meanwhile being constantly in contact.—Hydrogen-ion concentration of a soil suspension depends upon (a) temperature, (b) quantity of liquid and soil, (c) time of penetration, (d) treatment, such as shaking, (e) addition of salts. The season also has an influence.—*J. C. Th. Uphof*.

544. JURITZ, C. F. Calcium cyanamide. Its agricultural use as a fertilizer. Jour. Dept. Agric. Union of South Africa 1: 765-769. 1920.—A review of experiments with cyanamide is given. Under certain conditions of storage, dicyanamide is formed which is harmful to plants; its poisonous action is discussed. From the experiments cited the productive value of cyanamide is lower than that of nitrate of soda or sulphate of ammonia.—J. J. Skinner.

545. KELLEY, W. P., AND A. B. CUMMINS. Chemical effect of salts on soils. Soil Sci. 11: 139-159. Fig. 1-7. 1921.—A comparison was made between the analyses of the filtrate from a given soil after being treated with distilled water or with solutions of various salts. Chemically equivalent solutions of the chlorides, sulphates, and nitrates of a given base produced substantially equivalent chemical reactions in the soils studied. An exchange of bases took place with the result that a portion of the base of the added salt passed out of solution and a chemically equivalent amount of other bases was set free from the soil silicates; calcium is the base most easily replaced in the soils used. Considerable amounts of phosphate were precipitated by the soils. The reactions between neutral salts and soils are dependent upon the concentration and apparently obey the principle of mass action.—W. J. Robbins.

546. LIPMAN, J. G. New Jersey's experience with fertilizers. Potato Mag. 3^o: 7, 28, 30. 1 fig. 1921.

547. LIPMAN, J. G., A. W. BLAIR, W. H. MARTIN, AND C. S. BECKWITH. Inoculated sulphur as a plant-food solvent. Soil Sci. 11: 87-92. 1921.—The crop yields on field plots to which inoculated or uninoculated sulphur alone or with greensand marl or rock phosphate were added indicate that inoculated sulphur is more effective in rendering inert mineral plant food accessible to growing crops than uninoculated sulphur.—W. J. Robbins.

548. MARCHAND, B. DE C. Representative Transvaal soils. The Koedoespoort red loam. I. Jour. Dept. Agric. Union of South Africa 1: 722-727. 1920.—Fertilizer experiments show that this soil is improved by the addition of phosphates, especially basic slag. Potash and nitrogen do not increase the productivity of the soil. Chemical analyses of a number of samples are given and show the soil to be rich in iron and aluminum.—J. J. Skinner.

549. MASCHHAUPT, J. G. De invloed van grondsoort en bemesting op het gehalte onzer landbouwgewassen aan stikstof en aschbestanddeelen VII. [The influence of kind of soil and fertilizer upon nitrogen and ash content of agricultural crops VII.] Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. 23: 40-56. 1919.

550. OSBON, C. C. Peat in the Dismal Swamp, Virginia and North Carolina. U. S. Geol. Surv. Bull. 711^c: 41-59. 3 pl. 1919.—The Dismal Swamp covers approximately 2,200 square miles, of which a little more than 700 have been drained to a depth of 3 feet or more by the Dismal Swamp Canal and smaller ditches. Much of the drained land is farmed. In the remaining 1500 square miles peat deposits ranging in depth from 1 to 20 feet are found. The thickest beds lie in the region east and northeast of Lake Drummond, where peat 18 feet deep was exposed by comparatively recent excavations. The peat in this area is black and low in inorganic impurities and is probably the best in the swamp. In general, the depth of the peat gradually decreases toward the edge of the swamp, where the peat finally merges into the sands of the adjoining areas. It is estimated that the average thickness of the peat is 7 feet and the total available peat in the Dismal Swamp 672,000,000 tons. The peat deposits lie in shallow basins that originated in an extensive depression of the Columbia group of formations.—J. J. Skinner.

551. SCHERINGA, K. Is chemische denitrificatie van belang voor den landbouw en voor het water onderzoek? [Is chemical denitrification important for agriculture and the examination of water?] Pharm. Weekbl. 57: 1481-1483. 1920.—Some nitrogenous substances, such as the diazo compounds, easily give off nitrogen on account of the indifferent properties of the latter. Some years ago MARPMANN claimed that nitrogen can be liberated from nitroge-

nous substances without the aid of bacteria. Nitrites act on ammonia with the liberation of nitrogen; this action is increased when certain substances like aniline dyes, especially malachite green, fluorescein, or methyl red are present, while it is retarded, and even inhibited, in the presence of colloidal substances. Since well water contains quite a number of organic substances, which act as protective colloids, the simultaneous presence of ammonia and nitrites can be explained. Sterile soil acts like colloids. Some loss of nitrogen may occur in manure, but this loss is only a very slight one.—*H. Engelhardt.*

552. SEN, J. Report of the Imperial Agricultural Chemist. Sci. Rept. Agric. Res. Inst. Pusa 1919-20: 31-45. 1920.—An examination of soils of the Pusa farm to determine the effect of various fertilizers alone and in combination on permanent soil fertility leads to the conclusion that "the outstanding feature is the value of a combination of green manure and superphosphate."—Experimental evidence shows that superphosphate is held in calcareous soils by chemical combination, and, since the reaction goes on rapidly, the phosphate is restricted to surface layers of the soil. It is held in noncalcareous soils by adsorption, hence is widely and uniformly distributed through such soil, and is more available for use by the roots of growing plants. "The distribution of the phosphoric acid of those soluble phosphates which are without action on calcium carbonate, through a column of soil is of a uniform type even in highly calcareous soils, and the phosphoric acid penetrates to a considerable depth," suggesting that "such phosphates would be more efficacious than superphosphates in calcareous soils."—Under laboratory conditions, pieces of sugarcane with the cut ends sealed with paraffin, and kept in desiccators, showed slight increase in sucrose content; subsequent wetting causes a fall in sucrose content; these sucrose transformations are similar to those observed in cane windrowed under field conditions and are believed to be closely connected with enzymatic activity.—Repetition of water culture experiments indicates that poor results from cultures previously reported (Pusa Memoir Vol. II, No. 3, Botanical Series) were due to excessive concentration of the nutrient solutions, and not to the excretion of specific toxic substances by the roots.—Periodic analysis of the soil air in a mixed orchard showed the largest CO₂ content in a grassed plot, an intermediate amount in a grassed plot aerated by means of trenches, and least in a plot under surface cultivation. The percentage of CO₂ attains a maximum during the summer monsoon.—In manurial experiments with rice, ammonium sulphate along with phosphates gave increasing yields up to 160 pounds per acre, after which there was a decrease, till with 320 pounds per acre the yield was little better than with no nitrogen at all. Smaller applications of nitrogen increased the proportion of straw to grain; 80-160 pounds per acre gave maximum proportion of grain, and is therefore the most economical application. Green manure alone increased the crop up to 65 per cent, but in combination with ammonium sulphate had little effect. Ammonium sulphate produced an increase in the amount of nitrogen in the grain almost proportional to the amount of sulphate added as fertilizer.—*Winfield Dudgeon.*

553. SHEDD, O. M. A short test for easily soluble phosphate in soil. Soil Sci. 11: 111-122. 1921.—A test requiring less than 1 hour to complete is described for testing for easily soluble phosphate in soils. The relative amounts of precipitates are taken to indicate the need of the soil for phosphorous.—*W. J. Robbins.*

554. STEAD, ARTHUR. The agriculture and soils of the Cape Province, IV and V. Witkop-Burghersdorp. Jour. Dept. Agric. Union of South Africa 1: 660-670, 819-828. 1920.—Soils from a number of farms in the province were analyzed chemically and mechanically; their fertility is discussed.—*J. J. Skinner.*

555. TOTTINGHAM, W. E., AND E. B. HART. Sulfur and sulfur composts in relation to plant nutrition. Soil Sci. 11: 49-73. Pl. 1-4, fig. 1-2. 1921.—The changes in acidity, citrate-soluble and water-soluble phosphate, bacterial numbers, and the effects on crop yields of composts of soil or manure with sulphur or with sulphur and horse manure showed appreciable increase in acidity but no increase in citrate-soluble phosphate after 15 weeks. Sulphur

composts of manure decreased the loss of organic matter by fermentation although increased bacterial numbers were maintained. Citrate-soluble phosphate approximately doubled where sulphur was added. On Plainfield sandy loam the yield of oats was as great where sulphur compost was applied as where the treatment included rock phosphate. In greenhouse trials sulphur increased the yield of clover and of the Cruciferae and in field plots increased the yield of seed in barley. Sulphur appears to function as a fertilizer both by oxidation to the nutrient sulphate and by producing an acid condition favorable to the production of available phosphate. It remains to be proved whether the efficiency of sulphur is any greater when it is composted with rock-phosphate and manure than when these materials are added simultaneously to the soil.—*W. J. Robbins.*

556. WALTON, J. H. Report of the Imperial Agricultural Bacteriologist. Sci. Rept. Agric. Res. Inst. Pusa 1919-20:109-113. 1920.—A report of progress in the study of (1) nitrification of cow and sheep manures and various oil cakes, both in pot cultures and field plots, and (2) the nitrogen fixing power of various soil microorganisms.—*Winfield Dudgeon.*

557. WHITE, J. W. Lime requirement of Pennsylvania soils. Pennsylvania Agric. Exp. Sta. Bull. 164. 36 p., 6 fig. 1920.—This bulletin is a summary of a lime-requirement survey of Pennsylvania. The results are discussed in terms of CaCO_3 , or limestone required in pounds per acre to produce an alkaline soil to the depth of 7 inches as determined by the Veitch method. The survey includes a study of 1474 samples of soil taken from 50 counties and represents all of the soil series of agricultural importance. Seventy-two per cent of the soil areas in Pennsylvania were found to be acid, while 85 per cent of the river bottom soils of the state were acid. The average lime requirement of limed soils was found to be 1,749 lbs. per acre as compared to 3,105 lbs. where no lime had been used. No definite relation exists between the lime requirement and the texture of the soils.—The growth of clover and alfalfa in relation to the lime requirement of Pennsylvania soils is shown in the table.

SOIL SERIES	COUNTIES	AVERAGE LIME RE- QUIREMENT IN LBS PER ACRE	PER CENT ACID SOILS	AVERAGE TONS PER COUNTY, 1909	
				Clover	Alfalfa
DeKalb.....	Jefferson, Clearfield, McKean, and Venango	3993	87	22	411
Westmoreland.....	Greene, Washington, Beaver, and Allegheny	3149	77	93	596
Southeastern Soils..	Berks, Chester, Lancaster, York, and Lehigh.	460	25	527	3764

A classification of the important soil series of the state is included.—*C. R. Orton.*

558. WILSON, B. D. Nitrogen in the rain-water at Ithaca, New York. Soil Sci. 11: 101-110. 1921.—With an average yearly rainfall of 29.31 inches between May 1, 1915, and May 1, 1920, the soil received annually 12.51 lbs. of nitrogen per acre. Of this amount 11.5 lbs. was in the form of ammonia and 1.01 in the form of nitrates. The rainfall during the spring and summer contained more nitrogen than that of the fall and winter.—*W. J. Robbins.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See in this issue Entries 14, 86, 113, 233, 234, 345, 380, 461)

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, *Editor*SAM F. TRELEASE, *Assistant Editor*

559. ANONYMOUS. [Rev. of: GISSING, F. T. Peat industry reference book. *xxiv* + 292 p. Charles Griffin and Co.: London, 1920.] *Nature* 106: 594. 1920.—The book deals with developments in the industry which have arisen since publication of other books on the subject by the same author. The chief defect of the book is in the description of various processes from the point of view of inventors or exploiters.—O. A. Stevens.
560. ANONYMOUS. [Rev. of: HENDERSON, I. F., AND W. D. A dictionary of scientific terms: Pronunciation, derivation, and definition of terms in biology, botany, zoology, anatomy, cytology, embryology, physiology. *viii* + 354 p. Oliver and Boyd: Edinburgh and London, 1920.] *Nature* 106: 498-499. 1920.
561. ANONYMOUS. Natuurmonumenten in Ned. Indië. [Nature monuments in Dutch East India.] *Aarde en haar Volkeren* 57: 28. 1921.—The Government of Dutch East India has added 7 new areas to be reserved as natural monuments, making altogether 62. Important ones are in the district of Bandjarnegara, where some rare trees, such as *Palaquium Ottolanderi* and *Firminia colorata*, are protected. The Governor of Atjeh has been asked to take steps in the district of Serbadjadi for the protection of *Rafflesia Arnoldi*.—J. C. Th. Uphof.
562. ANONYMOUS. Steigerung des landwirtschaftlichen Ertrages durch Hochofenabgase. [Increasing yields by use of furnace gases.] *Fortwiss. Centralbl.* 42: 383. 1920.—This article gives data from a paper in the *Frankfurter Zeitung Supplement* for March 6, 1920, regarding experiments by RIEDEL in fertilizing various crops with purified furnace gases, in which the beneficial substance is CO₂. It is estimated that a daily output of 1,000 tons of iron produces enough CO₂ gas to grow 4,000 tons of crops like potatoes, and that enough gas is going to waste in Germany to supply the whole agricultural need.—W. N. Sparhawk.
563. BEREK, M. Über die einfachen und zusammengesetzten charakteristischen Konstanten der Mikroskopobjektive. [Simple and compound characteristic constants of the objective.] *Zeitschr. Wiss. Mikrosk.* 37: 36-41. 1920.
564. BRENCHLEY, W. E. The uses of weeds and wild plants. *Sci. Prog.* [London] 14: 121-133. 1919.—Weeds and wild plants are used quite extensively in some countries for human food, fodder, fibers, fuel, manures, drugs, dyes, and for miscellaneous purposes.—J. L. Weimer.
565. FYSON, P. F. Editorial retrospect. *Jour. Indian Bot.* 1^o: 10. [Unpaged insert.] May, 1920.—The success of the 1st year of the *Journal of Indian Botany* has justified the belief that such a publication is needed in India.—Winfield Dudgeon.
566. GROFF, ELIZABETH H. Soy-sauce manufacturing in Kwantung, China. *Philippine Jour. Sci.* 15: 307-316. 7 pl. 1919.—A description is given of the plant, utensils, and methods of preparation of sauce from soy beans, flour, salt, and water.—Albert R. Sweetser.
567. HOUSE, HOMER D. The wild flower preservation idea is one of practical value. *Torreyana* 21: 17-21. 2 fig. 1921.—Conservation is necessary, not only of our economic resources but also of those having recreational value. The destruction of plant life causes great damage to animal life also, and makes possible the introduction of noxious weeds. Many of our most beautiful wild flowers are becoming rare as the result of heedless destruction. Education along this line is needed, and the establishment of wild-life reserves is urged.—J. C. Nelson.
568. MACKENNA, J. Proceedings of the Board of Agriculture in India. 1919. 129 p., 1 pl. Pusa, 1920.—A report of the deliberations at the 11th biennial meeting of the Imperial,

Provincial, Native State and other agriculturists composing the Board of Agriculture in India. Among the subjects discussed are: Necessity for investigation into the conditions of nitrogen fixation in Indian soils; the maintenance of soil fertility under improved methods of agriculture; the advisability of the Agricultural Department undertaking to prepare popular bulletins describing improved methods of agriculture, and school readers containing lessons on agriculture; the conservation of by-products for fertilizer, from various industries; and the permanent experimental plots at the Agricultural Research Institute, Pusa.—*Winfield Dudgeon*.

569. MACKENNA, J. Annual report on the progress of agriculture in India, 1917-18. 324 p., 4 pl. Pusa, 1919.—Annual review of agriculture throughout British India, by the Agricultural Adviser to the Government of India. Covers much the same ground as the 1918-19 report (see Bot. Absts. 9, Entry 570).—*Winfield Dudgeon*.

570. MACKENNA, J. Annual report on the progress of agriculture in India, 1918-19. 186 p., 4 pl. Pusa, 1920.—Annual review of agriculture throughout India, by the Agricultural Adviser to the Government of India. It covers, among other agricultural topics: Agricultural conditions of the year. Scientific research in the agriculture and botany of rice (*Oryza sativa*), wheat (*Triticum vulgare*), cotton (*Gossypium* spp.), sugarcane (*Saccharum officinarum*), fiber plants, indigo (*Indigofera tinctoria*), tobacco (*Nicotiana tabacum*), linseed (*Linum usitatissimum*), sesamum (*S. indicum*), groundnut (*Arachis hypogea*), coconut (*Cocos nucifera*), castor (*Ricinus communis*), tea (*Camellia thea*), coffee (*Coffea arabica*), rubber, fruits, fodder-crops and grasses, potatoes (*Solanum tuberosum*), gram (*Cajanus indicus*), poppy (*Papaver somniferum*), barley (*Hordeum vulgare*), and beans (*Phaseolus lunatus*). Agricultural chemistry of soils, manures, sugarcane storage, indigo manufacture, and miscellaneous. Mycology and plant pathology,—diseases of rice, jute, sugarcane, chillies (*Capsicum* spp.), legumes, tea, coffee, rubber (*Hevea brasiliensis*), palms (*Borassus flabellifer* and *Areca catechu*), and miscellaneous. Agricultural bacteriology,—nitrification, green-manuring, nitrogen fixation, indigo manufacture, pebrine of silkworms, and sterilization of water. Agricultural demonstration and cooperation. Agricultural education. Among the appendices are lists of agricultural stations, agricultural colleges and schools, and of 143 agricultural publications in British India for 1918-19. [See also Bot. Absts. 9, Entry 569].—*Winfield Dudgeon*.

571. MERK, L. Das Bezeichnen und Wiederfinden beachtenswerter präparatestellen. [Marking and relocating of important points on slides.] Zeitschr. Wiss. Mikrosk. 37: 42-45. 1920.

572. METZ, C. Apertometer für Trockensysteme und Ölimmersionen. [Apertometer for dry systems or oil immersion.] Zeitschr. Wiss. Mikrosk. 37: 53-54. 1920.

573. METZ, C. Der makroskopische Zeichenapparat. [Macroscopic drawing apparatus.] Zeitschr. Wiss. Mikrosk. 37: 55-58. 1920.

574. MILLIGAN, S. Review of agricultural operations in India. 1919-20: 1-140. 3 pl. 1921.—This is the annual report of the Agricultural Adviser to the Government of India. Previous reports have appeared under the title "Progress of Agriculture in India." The report gathers together and summarizes the work of the imperial and local provincial agricultural departments during the year under review, and deals with: Agricultural conditions of the year; economic work on the more important crop plants; research and investigation in soils, fertilizers, windrowing of sugar cane, prussic acid in *Andropogon sorghum*, diseases of crops, insect pests, useful insects, and miscellaneous; agricultural engineering; district work; agricultural education; the cooperative movement as affecting agriculture; diseases, inoculation, and breeding of live stock, and veterinary education and research; publications of the imperial and provincial agricultural departments; and expenditure on the various agricultural departments. In 6 appendices are given special data for the year: A list of the agricultural stations in British India; a list of the agricultural colleges; operations of non-credit agricultural co-

operative societies; working of provincial civil veterinary departments; students in the veterinary colleges and schools; and a list of 153 publications put out by the various agricultural departments during the year.—*Winfield Dudgeon*.

575. MILLIGAN, S., AND G. S. HENDERSON. Report of the Director. Sci. Rept. Agric. Res. Inst. Pusa 1919-20: 1-9. 1920.—The report includes a statement of the staff in charge; a brief summary of the scientific work undertaken in various sections of the Institute; and a statement concerning the publications from the Institute during the course of the year under review.—*Winfield Dudgeon*.

576. SCHEMEHLIK, R. Polarisation im binokularen Instrument. [Binocular polarization.] Zeitschr. Wiss. Mikrosk. 37: 136-137. 1920.

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ENTRIES 577-1100

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 735, 873, 911, 916, 931, 941, 959, 961, 966, 1009, 1030, 1050, 1051, 1069, 1070, 1086)

577. ANONYMOUS. Destrucción de las malas yerbas. [Weed destruction.] Rev. Agric. [Mexico] 4: 414-415. 3 fig. 1919.—Popular.—John A. Stevenson.

578. ANONYMOUS. Emparve de trigos. [Stacking of wheat.] Defensa Agric. [Uruguay] 1: 309-315. 5 fig. 1920.—Taken from Bull. 34 Inspección Nacion. Ganaderia y Agric. Uruguay.—John A. Stevenson.

579. ANONYMOUS. Flax cropping. North Dakota Agric. Exp. Sta. Ext. Circ. 44. 4 p. 1921.—A popular treatment of the subject is presented.—L. R. Waldron.

580. ANONYMOUS. Home grown wheat. Nature 107: 89-90. 1921.—Increase of yield is much needed and is to be sought by use of improved varieties and fertilizers. Experiments seem to favor fall sowing.—O. A. Stevens.

581. ANONYMOUS. Local results with Glencope wheat. Agric. Gaz. New South Wales 32: 248. 1921.—Glencope wheat was originated by Mr. Cope in South Australia. Trial at Temora showed it to be comparatively low yielding.—L. R. Waldron.

582. ANONYMOUS. Plantas forrajeras. [Forage plants.] Informacion Agric. [Madrid] 11: 140-142. 3 fig. 1921.—*Trifolium pratense*, *T. hybridum*, and *Brassica napus* (colza or rape) are recommended as forage crops.—John A. Stevenson.

583. ANONYMOUS. That early blooming sweet clover. Amer. Bee Jour. 61: 142-143. 1921.—A description is given of an early-blooming variety of white sweet clover (*Melilotus alba*). It is reported to mature its seed 3 weeks before the common white form. It grows to a good height, ripens before the weeds, is a heavy seed producer, is a superior soil improver, and is usually hardy.—J. H. Lovell.

584. ANONYMOUS. Une nouvelle plante pour l'engrais vert. [A new green manure plant.] Jour. Sta. Agron. Guadeloupe 1¹: 14-15. 1920.—A field test with *Sesbania sericea* DC. as a green manure crop is briefly described. A chemical analysis of the crop is reported and the trial planting is said to have yielded at the rate of 117.74 lbs. of nitrogen per acre.—J. D. Luckett.

585. AHR, UND CHR. MAYR. *Grundlagen der Wiesen-Düngung.* [The fundamentals of fertilizing meadows.] 159 p. F. P. Datterer & Cie.: Freising, 1919.—Meadows furnish the greater part of the winter feed in Bavaria. Among the chief means for securing increased yields is the application of fertilizers, and the authors give in the first 87 pages an account of the fertilizer experiments carried on from 1912 to 1916 with nitrogen, phosphoric acid, and potash in different combinations and from different sources. It was found that the use of commercial nitrogenous fertilizers did not pay. When a meadow was properly supplied with lime, potash, and phosphate the yields were as good, and the amounts of nitrogen in the hay as high, as when commercial nitrogen was used.—In the 3rd and 4th sections, the authors discuss the fertilizer utilization and the fertilizer balance in the fertilizing of meadows as well as how to determine the manurial requirements, in which analyses of the hay for potash and phosphorus content can be very helpful. The authors quote with approval the statement of PAUL WAGNER that if the hay contains in the vicinity of 2 per cent potash or around 0.65 per cent phosphoric acid, further applications of these substances will not increase yields; but they call attention to important limitations in the application of this conclusion. Not only must the chemical analysis be constantly checked by a botanical determination of the species occurring and a separation of these into grasses, clovers or other legumes, and herbs, but the previous conditions of the meadow must be taken into account. Further care must be taken that the material for chemical analysis be carefully selected from the freshly cut meadow and not from the hay after it has been exposed to the weather.—A. J. Pieters.

586. AHR, J., UND CHR. MAYR. *Düngungseinflüsse auf Ertrag und Güte von Gerstensorten.* [Influence of fertilizer on yield and quality of barley varieties.] 124 p. F. P. Datterer & Cie.: Freising, 1919. Two years' results of pot tests of various fertilizers on different varieties of barley are reported. Six varieties of barley were used, as follows: 2 selections of Upper Bavarian, a Lower Bavarian, a Danubian, a 4th Bavarian and a Lower Frankish. Each of these received 10 different treatments: Unfertilized; single applications of nitrogen, phosphorus, potash, or lime; application of pairs of fertilizers, nitrogen and phosphorus, nitrogen and potash, and potash and phosphorus; complete fertilizer with lime; complete fertilizer without lime.—The plants showed a strong reaction to nitrogenous and phosphatic fertilizers. Nitrogen alone, while it stimulated culm production and increased yield, was not a satisfactory fertilizer as the quality of the grain was not good. Phosphorus and potash without nitrogen gave a good quality of grain, but the yield was greatly increased and the quality remained good when nitrogen and lime were added. Too much nitrogen is not desirable from the Bavarian point of view. The smaller kernels were highest in nitrogen, the larger highest in starch.—H. V. Harlan.

587. AMEND, FRIEDRICH WILHELM. *Untersuchungen über flämischen Roggen unter besonderer Berücksichtigung des veredelten flämischen Landroggen und seiner Züchtung.* [Investigations of Flemish rye with special reference to the improved Flemish "land" rye and its breeding.] Landw. Jahrb. 52: 615-670. 1919.—The small farmers of West Flanders have developed through selections in the old Flemish "land" rye, a new variety, which, while retaining the good qualities of the old, is improved in yielding ability, kernel weight, resistance to lodging, and ratio of grain to straw. Studies of the original and the improved sorts show that clubheadedness is correlated with density of heads and shorter kernels, but not with green color of kernels. Length of head is positively correlated with kernel weight and negatively with density. The short dense head shows slightly more sterility than the more loosely formed head. Kernel color and kernel quality are closely related, green color being preferable to brown. Form of head and culm development are closely related, short heads, each with a short peduncle, generally accompanying short culms. The degeneration of foreign ryes in Flanders is due to the maritime climate, which interferes with normal development.—C. E. Leighty.

588. AMES, C. T. *Cotton experiments at the Holly Springs Branch Experiment Station seasons of 1919 and 1920.* Mississippi Agric. Exp. Sta. Bull. 192. 10 p. 1920.—Results from variety tests on hill and valley land, fertilizer tests, and cotton spacing experiments are given;

also, certain suggestions in regard to cotton culture in the brown loam belt of north Mississippi. Cleveland, Miller, and Triumph are recommended for hill, and Wannamaker-Cleveland, Trice-270-41, and Express for valley land. Acid phosphate at the rate of 200 lbs. per acre and all forms of nitrogen gave paying results.—*H. B. Brown.*

589. AMES, C. T. Experiments with corn at the Holly Springs Branch Experiment Station. Mississippi Agric. Exp. Sta. Bull. 189. 8 p. 1920.—This report gives in brief results from corn variety and fertilizer experiments conducted at the North Mississippi Experiment Station from 1912 to 1920. Corn culture suggestions are also given. Nitrogen fertilizers were the only ones that gave consistently profitable gains.—*H. B. Brown.*

590. AMES, C. T. Report from Holly Springs Branch Experiment Station for 1915 to 1920 inclusive. Mississippi Agric. Exp. Sta. Bull. 193. 22 p., 2 fig. 1920.—This report gives in brief results from corn and cotton variety tests, cultural and fertilizer experiments, and results from experiments with sweet potatoes, Bermuda grass, bur clover, crimson clover, velvet beans, cowpeas, alfalfa, and dairying.—*H. B. Brown.*

591. AYRES, W. E. Corn variety tests 1913 to 1920 at the Delta Branch Station. Mississippi Agric. Exp. Sta. Bull. 198. 7p. 1921.—In the corn variety tests Cocke's Prolific, Ewing's Mosby, Hasting's Prolific, Woodruff's Mosby, and Vardaman were the highest yielding varieties.—*H. B. Brown.*

592. AYRES, W. E. Cultural experiments with cotton at the Delta Branch Station. Mississippi Agric. Exp. Sta. Circ. 35. 4 p. 1921.—Unthinned rows yielded most, but the use of this form of culture is not practicable on account of the difficulty of keeping down weeds. Rows 4 feet apart are considered best with plants 8 inches apart in the row. Factors are given for determining yields when the number of bolls on a 30-foot row is known.—*H. B. Brown.*

593. AYRES, W. E. Varieties of cotton 1919 and 1920 and summary of ten years' results, 1911-1920, at the Delta Branch Station. Mississippi Agric. Exp. Sta. Circ. 36. 4 p., 1 fig. 1921.—In the experiments with cotton Express, Foster, Wannamaker-Cleveland, Lone Star, Webber-49, Trice, Sunflower, Columbia, Triumph, and Miller varieties led in money value per acre in the order given.—*H. B. Brown.*

594. BREAKWELL, E. The production of better seed in other countries. Agric. Gaz. New South Wales 32: 245-248. 1921.—Methods of crop improvement in Sweden and methods of improved seed increase and dissemination in Sweden and Canada are briefly described.—*L. R. Waldron.*

595. BRENCHLEY, W. E. Indian agriculture. Nature 107: 58-59. 1921.—A brief review of several papers is presented. India is a land of small cultivators who are intensely conservative, usually poor, and unable to take risks in the adoption of new methods. Fertilizers and control of crop pests are especially needed.—*O. A. Stevens.*

596. BROWN, H. B. Corn experiments. Mississippi Agric. Exp. Sta. Bull. 197. 20 p., 2 fig. 1921.—A brief report is presented of certain corn experiments conducted in east-central Mississippi from 1911 to 1920. Cocke's Prolific, Tennessee Red Cob, Vardaman, and Paymaster were the best yielding varieties for early planting, and Laguna, Mexican June, and Goliad for late planting. Inbreeding gave poor-yielding strains; F₁ hybrids of commercial varieties gave but slight gains over their parents. No commercial fertilizers except those containing nitrogen were profitable.—*H. B. Brown.*

597. BROWN, H. B. Why not plant home grown cotton seed? Mississippi Agric. Exp. Sta. Circ. 37. 4 p. 1921.—Tests show that seed from varieties grown within the State produce better-yielding progenies than seed grown in other states.—*H. B. Brown.*

598. BROWN, H. B., AND C. B. ANDERS. Cotton experiments 1919 and 1920. Mississippi Agric. Exp. Sta. Bull. 187. 32 p., 4 fig. 1920.—A review is presented of results from a study of leading upland varieties of cotton during 1919 and 1920, with an outline of the environmental conditions under which the tests were made; also of certain fruiting studies, boll weevil control experiments, cotton culture suggestions, and of the relation of oil content of cotton seed to length of lint, size of seed, lint percentage, and nitrogen content of seed. Long staple varieties led in money value, with Foster-120-631 heading the list. A positive correlation was found between oil content of seed and length of lint, and a negative correlation between oil content and size of seed, lint percentage and nitrogen content.—*H. B. Brown.*

599. BROWN, W. ROBERTSON, W. H. HARRISON, AND P. B. SANYAL. Windrowing sugarcane in the Northwest Frontier Province. Part I. The effect on the economical and agricultural situation. Part II. The effect on the composition of sugarcane. Mem. Dept. Agric. India Chem. Ser. 5: 237-246. 1920.—Storage of sugarcane by windrowing, a farm operation practiced to prevent freezing of stalks, can be successfully carried out in the Peshawar Valley. Windrowing tends to bring about a deterioration of the juice, but at the same time causes a concentration of the juice so that the amount of crystallizable sugar per unit of juice remains approximately constant. The weight of sucrose and crystallizable sugar in windrowed cane increases rapidly at first, followed by a period when the values remain constant, after which deterioration sets in. The length of the period during which cane can be stored varies with the season.—*J. J. Skinner.*

600. BURTT-DAVY, JOSEPH. Utilizing prickly pear and spineless cactus. Their value as fodder for live stock. South African Jour. Indust. 3: 1000-1011. 1920.—The author discusses the utilization of prickly pear and spineless cactus under South African conditions, and brings out the fact that, because of its high water content, it is of especial value in time of drought. As a roughage with more concentrated feed for feeding cattle and as an accessory to the dairy rations when fed with more concentrated foods and some hay or pasture, prickly pear supplies succulence difficult to secure in semi-arid regions during a large period of the year. Working oxen can be maintained for an indefinite period on a ration consisting very largely of prickly pear. Methods of removing the spines, preparation of the cactus as a feed, and chemical analyses are given. The danger of prickly pear becoming a serious pest is pointed out.—*Mary R. Burr.*

601. CORREIA AFONSO, PEDRO. A adubação dos arrozais em teoria na pratica. [Theory and practice of rice fertilization.] Bol. Agric. [Nova Goa, Portuguese East India] 1: 229-243. 1919.—A very general discussion is presented of rice fertilization both with chemical fertilizers, such as phosphates, and green manure crops. *Crotalaria*, *Dolichos*, *Phaseolus* spp., and *Sesbania* are mentioned in particular in the latter connection. Tables giving the chemical composition of the various fertilizers discussed are given.—*John A. Stevenson.*

602. CORREIA MENDES, F. C. Relatorio de alguns serviços mais importantes a cargo da direcção dos serviços agricolas e florestais. [Report of the more important projects of the agriculture and forestry service.] Bol. Agric. [Nova Goa, Portuguese East India] 1: 215-229. 1919.—An account is given of the introduction of seed rice of improved varieties from British India for the purpose of improving rice culture in Portuguese India.—*John A. Stevenson.*

603. ELORDUY, SAMUEL T. Algunas indicaciones a los cultivadores de maiz. [Hints to corn cultivators.] Rev. Agric. [Mexico] 5: 344-349. 10 fig. 1920.—A popular account is given of seed selection as a means of improving the corn crop of Mexico.—*John A. Stevenson.*

604. FERRIS, E. B. A report of work at McNeill Branch Experiment Station from 1912 to 1917 inclusive. Mississippi Agric. Exp. Sta. Bull. 188. 23 p. 1920.—A brief report is presented of experiments with fruits, vegetables, cotton, corn, sorghum, cowpeas, soybeans, velvet beans, oats, wheat, sweet potatoes, and fertilizers at McNeill, in south Mississippi.—*H. B. Brown.*

605. FERRIS, E. B. Cotton growing in south Mississippi. Mississippi Agric. Exp. Sta. Bull. 196. 8 p. 1920.—Cotton yields in south Mississippi are very uncertain on account of heavy boll weevil damage. Trice is the best variety, and Cleveland probably next. 300 lbs. acid phosphate per acre and some nitrogen carrier are recommended as fertilizers.—H. B. Brown.

606. FERRIS, E. B. Report from south Mississippi Branch Experiment Station for 1918 to 1920 inclusive. Mississippi Agric. Exp. Sta. Bull. 194. 23p. 1920.—This report gives a history of the South Mississippi Station and results from experiments conducted in 1919 and 1920.—H. B. Brown.

607. FORTUN, GONZALO M. Cultivo de la caña de azucar en Cuba. [Sugarcane cultivation in Cuba.] Rev. Agric. [Mexico] 4: 421-426. 1919.—Popular.—John A. Stevenson.

608. GIROLA, CARLOS D. Algo sobre cuestiones forrajeras. [Forage crop problems.] Publ. Mus. Agric. Republica Argentina 22: 1-7. 1920.—Careful consideration should be given to the problem of providing pasturage to maintain and increase the live stock industry of Argentina, which in 1918 had a total export value of 500,000,000 pesos gold. Various plants, among them *Atriplex semibaccata*, *Polygonum sachalinense*, *Symphytum asperrimum*, and various of the sorghums have been exploited but are unsatisfactory except under especial limited conditions. Alfalfa will take first rank among the forage crops of the country with a planted area of 10,000,000 hectares. Rye grass, brome grass, the Paspalums and other grasses have proven satisfactory when properly cultivated.—John A. Stevenson.

609. GUTHRIE, F. B. Analyses of lucerne and tree-lucerne. Agric. Gaz. New South Wales 32: 238. 1921.—Analyses showed that the 2 plants are similar in composition.—L. R. Waldron.

610. HARLAN, HARRY V., AND STEPHEN ANTHONY. Effect of time of irrigation on kernel development of barley. Jour. Agric. Res. 21: 29-45. 20 fig. 1921.—“At Aberdeen, Idaho, deposit of dry matter in the barley (*Hordeum*) kernel continues until very near the point of absolute ripeness. The plants are able to utilize water up to the date of full maturity.” Late irrigation results in a later maturity. Shortage of water even when the spikes are turning yellow stops the depositing of dry matter. Shortage of water during the early development of the kernel probably determines the size of the kernel, even before the rate of depositing of dry matter is checked.—D. Reddick.

611. HARTH, E. Zwiebelanbauversuche im Jahre 1920. [Onion culture investigations in 1920.] Mitteil. Deutsch. Landw. Ges. 36: 254-257. 1921.—Four varieties of onions were tested in 7 sections. Much of the information is given in tabular form and covers shape, size, and color of bulb, and yields of marketable and unmarketable bulbs.—A. J. Pieters.

612. HAYWOOD, A. H. The culture of sugar cane in New South Wales. Agric. Gaz. New South Wales 31: 773-780, 853-859. 1920; 32: 28-32, 181-184, 257-260. 13 fig. 1921.—The area devoted to sugarcane is along rivers on the north coast of New South Wales. The acreage in 1895 was 33,000, which was gradually reduced to 11,000 by 1917; yield of sugar per acre has increased. The author discusses various phases of sugar cane culture in common practice from the preparation of the land to the harvesting of the crop. Important varieties are described, and some of these are figured. Four diseases,—gumming, leaf-scald, Fiji disease, and yellow stripe,—are described and discussed as to prevention and control.—L. R. Waldron.

613. JONES, D. F. Connecticut round tip tobacco. A new type of wrapper leaf. Connecticut [New Haven] Agric. Exp. Sta. Bull. 228. 287-292, pl. 16-17, fig. 1-4. 1921.—A description of a new variety of tobacco developed by hybridization and selection is given. The tip of the leaf is round permitting the cutting of a larger number of wrappers than can be had from the leaf of the varieties usually grown in the state. Field tests on farms for 4 years indicate that the variety is productive and has merit as a wrapper leaf.—Henry Dorsey.

614. JURITZ, CHAS. F. Prickly pear as a stock food. Jour. Dept. Agric. Union of South Africa 1: 848-851. 1920.—The author states that prickly pear has been of service in South Africa for ostriches, oxen, and pigs. During drought, prickly pear forms a valuable emergency ration but cannot be advantageously fed to stock unless mixed with more concentrated food; to the latter it is a valuable accessory.—*Mary R. Burr.*

615. KENNEDY, E. W. Wheat varieties under trial. Agric. Gaz. New South Wales 32: 241. 1921.—Yields are given of 4 wheat varieties at Condobolin Experiment Farm.—*L. R. Waldron.*

616. KHOLS, G. Steigerung der Ernteerträge durch vervollkommnete Bodenbearbeitung und Saatenpflege. [Increased yields by perfect soil preparation and care of seed.] Mitteil. Deutsch. Landw. Ges. 36: 225-235. 1921.—A review is presented of work done in 1911-1914, in the cultivation of grain. The author shows that the use of a press drill and of a special cultivator (Hack maschine) was advantageous, especially for wheat. Although the weed problem is not discussed the author quotes with approval a statement of RÜMKER: "He who cultivates, to destroy weeds, generally cultivates too late to derive the full profit from his labor."—*A. J. Pieters.*

617. KOCH, PIETER. Seed selection of tobacco. Sun and Agric. Jour. South Africa 11: 44-47. 1920.—The author discusses the characters to be kept in mind when selecting different types of tobacco, and gives notes with illustrations on the technique of bagging and grading.—*A. J. Pieters.*

618. McCAULEY, C. Field experiments with fodders. Cowra experiment farm. Agric. Gaz. New South Wales 32: 237-238. 1921.—Cereals for hay yielded from 6 to nearly 9 tons of green fodder per acre. Rape yielded nearly 6 tons and swede turnips 2.5 tons per acre.—*L. R. Waldron.*

619. MACH, F., P. LEDERLE, U. S. W. Prüfung verschiedener Verfahren zum Rauchbar-machen kleiner Tabakmengen. [Tests of various methods for curing and preparing small quantities of tobacco.] Mitteil. Deutsch. Landw. Ges. 36: 215-217. 1921.—The author describes 3 methods for the home curing of small quantities of tobacco. Tables are given showing the percentages of various substances in the tobaccos cured by each method.—*A. J. Pieters.*

620. McKERRAL, A. Report of the Hmawbi Agricultural Station; Report on the Tatkôn Agricultural Station. Ann. Rept. Agric. Sta., Agric. Chem., Agric. Eng., Asst. Bot. Northern Circle, and Asst. Entomol. Burma 1918-1919: 69-89. 1920.—The report records progress in experiments with fertilizers; methods of cultivation; and selection, trial, and distribution of seeds of crop plants.—*Winfield Dudgeon.*

621. MATENAERS, F. F. Die Silage aus dem Gemenge von Hafer, Erbsen und Wicken. [Silage out of a mixture of oats, peas, and vetch.] Mitteil. Deutsch. Landw. Ges. 36: 249. 1921.—Much of the paper is a plea for the greater use of the silo in Germany. A brief account of the successful use of a mixture of oats, pea, and vetch silage in Iosco County, Michigan, is presented.—*A. J. Pieters.*

622. MUNDY, H. G., J. A. T. WALTERS, AND G. MAINWARING. Annual report of experiments, Experiment Station, Salisbury, 1919-20. Rhodesia Agric. Jour. 18: 33-42. Fig. 1-3. 1921.—The authors report results of rotation experiments with maize, giving general cultural practices and systems of fertilizing, arriving at the following conclusions: (1) The marked advantage of a change of crop; (2) the increased yield after a straw crop, the stubble of which is ploughed under thereby supplying organic matter to the soil; (3) the still greater yield when the previous crop has been a legume; (4) the outstanding merit of velvet beans as a previous crop; (5) the advantage of early planting in a normal season on the high veld.—Liming trials on ground nuts, maize, beans, summer wheat, and boer manna are reported. No marked

general increase in yield of grain or hay can be attributed to the use of lime in the case of any of these crops.—Variety tests for ground nuts are reported as well as experiments with 19 varieties of dwarf beans and 20 of runner beans. Seed yields of important legumes such as velvet beans, Canadian beans, tepary beans, soybeans, field pea, and chick pea are given. Flax grown for fiber and for seed is discussed. Results with root crops are presented.—*Mary R. Burr.*

623. OLIVARES, DANIEL. El cultivo de la alfalfa y su henificación. [Alfalfa cultivation and the making of hay.] *Rev. Agric. [Mexico]* 5: 427-430. 6 fig. 1920.—Popular.—*John A. Stevenson.*

624. OLSEN, EDGAR I. Fifteenth annual report of the state demonstration farms, 1920. *North Dakota Agric. Exp. Sta. Bull.* 148. 38 p., 8 fig. 1921.—Detailed yields are given and methods of operation for the 19 demonstration farms operating in North Dakota. Figures are given for cost of production and also milling and baking data for 29 samples of wheat, grown on the different farms. The report deals with the following crops: Wheat (common and durum), oats, barley, flax, corn, potatoes, alfalfa for hay and seed, timothy, and sweet clover. For 1920 the demonstration farms showed a net profit of \$3.13 per acre.—*L. R. Waldron.*

625. OPAZO, ROBERTO. Cultivo de plantas oleaginosas. [Cultivation of oil plants.] *El Agricultor [Chile]* 5: 195-198. 5 fig. 1920.—Brief cultural directions are given for the peanut, sunflower, poppy, sesamum, and soybean. The olive is not recommended because of its slow growth.—*John A. Stevenson.*

626. OVERGAARD, J. C. Undersogelser over Landbrugets Driftsforhold. [Survey of the business of agriculture.] *Tidsskr. Landokonomi* 1921: 78-87. 1921.—A description is given of economic conditions in Danish agriculture during 1918-19. Tables are included showing the number and size of farms under cultivation, and presenting statistics for livestock on farms, butter production, etc.—*Albert A. Hansen.*

627. PRIDHAM, J. T. The elimination of the unfit. *Agric. Gaz. New South Wales* 32: 235-236. 1921.—The article advocates for use varieties improved by pure line breeding.—*L. R. Waldron.*

628. PRIDHAM, J. T. Varieties of oats tested in New South Wales. *Agric. Gaz. New South Wales* 32: 249-252. 1921.—Notes are given on 72 varieties, including synonyms, in regard to season, character of leaves and straw, appearance of grain, breeding or origin, defects, good points, and districts to which they are suited.—*L. R. Waldron.*

629. RAMÍREZ, ROMÁN. Anonacea textil. [An anonaceous textile plant.] *Rev. Agric. [Mexico]* 4: 505. 1 fig. 1919.—A brief description is given of *Rollinia* sp. and the fiber obtained from it.—*John A. Stevenson.*

630. ROOT, A. I. The new sweet clover, grown by the acre. *Gleanings in Bee Culture* 49: 46-47. Fig. 1-2. 1921.—The new annual sweet clover is a mutant of white sweet clover (*Melilotus alba*). Brief reports are given on the cultivation of annual sweet clover in Ohio, Vermont, Illinois, and Iowa.—*J. H. Lovell.*

631. SAEZ, DANIEL. El cultivo del algodón en Artigas. [Cotton cultivation in Artigas.] *Defensa Agric. [Uruguay]* 1: 281-283. 1920; 2: 24-25. 1921.—A popular account of cotton cultivation is presented.—*John A. Stevenson.*

632. SAILLARD, ÉMILE. Ensayos culturales sobre diversas variedades de remolacha azucarera durante el año 1920. [Cultural experiments with sugar beet varieties in 1920.] *Informacion Agric. [Madrid]* 11: 132-135. 1921.—Experiments were undertaken in 1920 by the syndicate of sugar manufacturers of France with sugar beet varieties. Five foreign and 5

native varieties were tested in 7 localities; the native varieties proved slightly superior. A brief account is given of trials made in England with some of the same varieties. The results of the analyses of 3088 sugar beet roots of the variety Vilmorin B are given. Those containing 19.5 to 20.5 per cent of sugar represented 65 per cent of the total number. In weight, 77 per cent contained between 600 and 1000 gm. of sugar, and included most of the roots with a sugar content of over 20.5 per cent.—*John A. Stevenson.*

633. SARRASIN, J. MAIMÓ. Una planta dañina. La Melica macra o pasto serrucho. [A noxious weed. *Melica macra* or saw grass.] Defensa Agric. [Uruguay] 2: 5-9. 4 fig. 1921.—This grass has become a bad weed in the uplands of Uruguay where it is spreading rapidly. It is not eaten by stock nor injured by fire. The spines are injurious to sheep.—*John A. Stevenson.*

634. SCHERFFIUS, W. H. Factors that affect the growth, reproduction, and maturity of tobacco. Jour. Dept. Agric. Union of South Africa 1: 728-731. 1920.—The author briefly discusses the factors light, including intensity, quality and duration; temperature and moisture; chemical changes; fertility of soil; and their effects on growing tobacco plants.—*Lyman Carrier.*

635. SEARS, R. N. A new clover. Amer. Bee Jour. 61: 141. 1921.—At Alturas, Modoc County, in the northern part of California, cow clover (*Trifolium involucratum*) is common in the meadows and along streams. According to F. C. PELLETT, cow clover resembles alsike clover and has every characteristic of a valuable forage plant. The honey from this new clover is paler than that from alfalfa.—*J. H. Lovell.*

636. SHEPHERD, A. N. Farmers' experiment plots. Hay trials, 1920. Murrumbidgee irrigation areas. Agric. Gaz. New South Wales 32: 239-241. 1921.—Trials were conducted on 4 farms. The results from wheats and oats were nearly the same. Zealand wheat was excellent for hay production under irrigation and Yandilla King gave good returns.—*L. R. Waldron.*

637. SPARKS, G. C. Farmers' experiment plots. Wheat, oat and barley experiments, 1920. Southern district. Agric. Gaz. New South Wales 32: 229-234. 1921.—These experiments were conducted upon 12 farms; seasonal and soil notes are given. Canberra, Federation, and Yandilla King yielded best. The new variety, Gresley S3, did well at the 1 place where tried. Standard manuring with 56 lbs. of superphosphate per acre gave best results. Early seeding gave best results at 1 farm. Graded seed gave the best average results. Heavy seeding gave the best results generally. One trial showed better yield for unacclimatized seed. Oat and barley trials showed no positive results.—*L. R. Waldron.*

638. THOMPSTONE, E. Report of the Mandalay Agricultural Station; Report on the Botanical Area, Mandalay; Report on the Bogyi and Nagu Plots; Report of the Padu Agricultural Station; Report of the Hopin Agricultural Station; Report of the Yawngnwe Agricultural Station; Report of the Hsumhsai Experimental Station. Ann. Rept. Agric. Sta., Agric. Chem., Agric. Eng., Asst. Bot., Northern Circle, and Asst. Entomol., Burma 1918-1919: 1-68. 1920.—At the various stations and plots, work is carried on in investigation of fertilizers and fertilizer methods; methods of cultivation; selection, trial, and distribution to cultivators of promising varieties of field crops. Attention has been given to 2 special problems: The parasitism, and methods of eradication, of *Striga lutea*; and the value and methods of utilization of *Eichornia crassipes* as fertilizer material.—*Winfield Dudgeon.*

639. TROWBRIDGE, P. F. Report of the director, North Dakota Agricultural College Experiment Station, for the fiscal year ending June 30, 1920. North Dakota Agric. Exp. Sta. Bull. 146. 48 p., 6 fig. 1921.—The work reported upon includes comparative yield tests with wheat in a rotation series. Rotation plots in 1919, when rust was exceedingly prevalent, gave better yields than the plots continuously cropped. Baking and milling tests of varieties of wheat

are discussed, likewise forage-crop investigations, including nurse crop experiments with sweet clover, and a botanical study of the vegetative habits of *Bromus inermis*. Notes are given on diseases of wheat and potatoes, disease control, barberry eradication, and resistant strains of flax.—*L. R. Waldron*.

640. VARGAS, LEANDRO M. Cultivo del ramie. [Cultivation of ramie.] Rev. Agric. [Mexico] 5: 507-518. 8 fig. 1920.—A general account is given of the culture of ramie (*Boehmeria nivea* and related species), including geographical distribution, climatic and soil requirements, and botanical description. The method of preparing the fiber is described.—*John A. Stevenson*.

641. VARGAS, LEANDRO M. Cultivo de la Sansevieria. [Sansevieria cultivation.] Rev. Agric. [Mexico] 5: 583-585. 2 fig. 1920.—The growing of sansevieria (*Sansevieria* spp.) is recommended for Mexico. A popular account of the plant and approved methods of cultivation are given.—*John A. Stevenson*.

642. WALTERS, J. A. T. New crops for Rhodesia. Report on some of the experiments conducted at the Agricultural Experiment Station, Salisbury, and the Gwebi Farm, 1919-1920. Rhodesia Agric. Jour. 17: 432-435. Pl. 1-5. 1920.—Among the hay crops tested on the experiment station at Salisbury and the experiment farm at Gwebi, Teff (*Eragrostis abyssinica*) made the largest yield, 4,441 lbs. per acre. Kudzu, velvet beans, Boer manna (*Setaria italica*), summer oats, and Sudan grass yielded in the order named. Mixtures of 2 or 3 crops made higher yields than any of the crops alone. The Niger oil plant (*Guizotia oleifera*), Sunn hemp (*Crotalaria juncea*), Gotani bean (*Canavalia gladiata*) [error, = *C. ensiformis*], Kafir beans (*Vigna sinensis*), black velvet beans (*Stizolobium utile*) [error, = *S. aterrimum*], Florida velvet bean (*Stizolobium deeringianum*), and ground nuts (*Arachis hypogaea*) were tested as green manures and yielded in the order named from 29,040 to 7,920 lbs. per acre. Among the cereals, Kherson oats and buckwheat were promising, the latter principally on account of its freedom from disease. Eighteen varieties of Kafir corn, 34 of Dhal (*Cajanus indicus*), and several of field peas were also tested.—*H. N. Vinall*.

643. WARTH, F. J. Annual Report of the Agricultural Chemist to Government, Burma. Ann. Rept. Agric. Sta., Agric. Chem., Agric. Eng., Asst. Bot. Northern Circle, and Asst. Entomol. Burma 1918-1919: 90. 1920.—Progress is recorded in investigations on rice soils; and on Burma beans (*Phaseolus lunatus* L.).—*Winfield Dudgeon*.

644. WERTH, E. Übersicht über die Kartoffelsorten, die sich bei den bisher in Deutschland angestellten Versuchen zur Prüfung der Widerstandsfähigkeit gegen Kartoffelkrebs bewährt haben. [Review of the potato varieties which have, in the experiments so far carried on in Germany, retained their immunity to potato wart.] Mitteil. Deutsch. Landw. Ges. 36: 262. 1921.—The author lists a total of 52 varieties of potatoes and gives in tabular form information as to skin, flesh, form, total number of experiments, and degree of infection.—*A. J. Pieters*.

645. WIERUP. Anbauversuche mit Bohnen. [Culture experiments with beans.] Mitteil. Deutsch. Landw. Ges. 36: 245-249. 1921.—Reports are given from 6 different stations on tests of a number of varieties of field beans.—*A. J. Pieters*.

646. YOUNG, THOMAS. Flax growing in Scotland. Trans. Highland and Agric. Soc. Scotland 22: 79-100. 1920.—The history of flax growing in Scotland and its reestablishment during the war are discussed.—*H. V. Harlan*.

647. ZURCHER, F. A. Non-setting of Uba seed. South African Sugar Jour. 5: 245. 1921.—The Uba sugar-cane arrows freely in Portuguese East Africa (the Zambesia and Quilimane districts) but the flowers are sterile. For 4 years experiments have been made in which every means and care were taken to obtain fertilization, but no seed has set.—*C. Rumbold*.

BIBLIOGRAPHY, BIOGRAPHY AND HISTORY

NEIL E. STEVENS, *Editor*

(See also in this issue Entries 606, 646, 680, 703, 799, 1073, 1076, 1078, 1080)

648. ANONYMOUS. Augustin de Candolle. Roy. Bot. Gard. Kew. Bull. Misc. Inform. 1920: 219-220. 1920.—Richard Emile Augustin de Candolle (1868-1920), younger son of Casimir de Candolle, was born and received part of his education in England. Though trained for the law, he devoted himself largely to scientific pursuits and had a wide range of scientific interests. For the period 1912-1918, he served as British consul for the Canton of Geneva, relinquishing this post on the death of his father, to take up the custodianship of the famous Candollean library and herbarium and to resume his interrupted scientific occupations.—*M. F. Warner.*

649. ANONYMOUS. Biography and portrait of Dr. F. Kolpin Ravn made available. Phytopathology 11: 101-102. 1921.

650. BACCARINI, PASQUALE. [Piero Bargagli, 1844-1918.] Bull. Soc. Bot. Ital. 1918: 68. 1918 [1919].—Bargagli was one of the founders of the Italian Botanical Society and author of a number of botanical papers.—*M. F. Warner.*

651. BRITTEN, JAMES. London Pride. Garden 84: 528. 1920.—The author discusses the question whether this name for *Saxifraga umbrosa* is derived from the city, or, as has been asserted, from George London (died 1713), who founded the Brompton Park Nursery in 1681, and was gardener to Henry Compton, Bishop of London, to William and Mary, and to Queen Anne. The name "London Pride" was given to Sweet William as far back as 1633, being found in Johnson's edition of Gerard, and while it was applied to *Saxifraga umbrosa* by Molyneux (Phil. Trans. 19: 570) in 1697, it seems unlikely that it originated with George London, as it had so long been used for another familiar plant. Other plants to which the name has been applied are mentioned, as well as other names referring to the same plant.—*M. F. Warner.*

652. BUNYARD, E. A. John Tradescant, senior. Jour. Pomol. 1: 138-196. 1 fig (portrait). 1920.—Tradescant has been identified by Dr. J. HAMEL as author of the MS. in the Record Office, entitled "A Voiag of Ambussad undertaken by the Right Honourable Sir Dudlie Diggs in the year 1618," which took him to Archangel. In 1611 he visited the Low Countries in search of new plants and fruits for Lord Salisbury's gardens at Hatfield; in 1620-21 he joined Mansell's expedition against the Algerian pirates, and succeeded in bringing home plants and flowers; and in 1627 he accompanied the Duke of Buckingham on his ill-fated expedition to La Rochelle. The rare Musaeum Tradescantianum is the list of curiosities in "Tradescant's Ark" at Lambeth, published by the younger John Tradescant in 1656.—*M. F. Warner.*

653. BUTLER, E. J. The imperial (British) Bureau of Mycology. Phytopathology 11: 100. 1921.—The purpose of the Bureau, now established at Kew, and the scope of the work to be carried on are given.—*B. B. Higgins.*

654. C., H. Ancient mulberry trees and their history. Country Life [London] 43: 145. Illus. 1918.—Many specimens have been planted by famous personages. One still standing and bearing excellent fruit at Christ Church College, Cambridge, is reputed to have been planted by Milton, but is probably the last of 300 trees set out in 1608-09, the year of his birth. Those at Syon House are of especial interest, including one said to be the oldest in England, introduced from Persia in 1548. Another, planted at Buckingham Palace at the time of the edict of James I for the introduction of silk culture into England, is still bearing fruit. Although the mulberry was made fashionable by this edict about 1605, it is an interesting fact that the trees then planted were mostly of the black sort, the leaves of which are not valuable for silkworms.—*M. F. Warner.*

655. DANGEARD, P. A., H. LECOMTE, ET E. PERRIER. Discours prononcés aux obsèques de M. Éd. Bureau, professeur honoraire du Muséum. (18 décembre 1918.) [Funeral addresses for Édouard Bureau.] Bull. Mus. Hist. Nat. Paris 25: 2-11. 1919.—Three addresses on the life and career of Louis Édouard Bureau (1830-1918) are given. Dangeard, president of the Botanical Society of France, refers to him especially as one of the founders of the society; his work as a botanist, and particularly in the field of paleobotany, with his long active scientific service (1872-1906) at the Paris Museum of Natural History, are discussed by Lecomte of the Museum; while Perrier, as its director, speaks more particularly of Bureau's official connection with that institution.—*M. F. Warner.*

656. FAIRCHILD, DAVID. An agricultural explorer in China. Asia 21: 7-13. *Illus.* 1920 [1921].—A popular sketch of the unusual personality, romantic and dangerous experiences, and practical achievements of FRANK N. MEYER, who disappeared from a steamer on the Yangtze River, June 2, 1918. Some of his important introductions are briefly discussed: Fruits, ornamentals, a wild chestnut with strong resistance to the bark disease, and many others. His peculiar qualifications for, and devotion to, his work are emphasized. "His life was always that of a plantsman"—"extremely sensitive to the world around." His associates in the Office of Foreign Seed and Plant Introduction have established in his honor a medal to be awarded yearly for valuable work in plant introduction, the first recipient of which was Mr. Barbour Lathrop of San Francisco, the second Dr. L. Trabut, of Algiers.—*M. F. Warner.*

657. FAURÉ-FREMIET, E. Le mouvement actuel pour la réorganisation des recherches scientifiques en France. [The present movement for reorganization of scientific research in France.] Bull. Soc. Philomathique Paris X, 11: 1-79. 1920.—The author presents a history of the organization and activities of various French and inter-allied scientific conferences and federations during 1919 and 1920. The results obtained are summarized under the headings: Fauna of France; analytic bibliography; scientific publications; material aid to societies.—*C. E. Allen.*

658. GUYER, R. G. Cultivation of medicinal plants in Scotland—past and present. Pharm. Jour. 106: 146-149, 168-171, 190-192. *Fig. 1-6.* 1921.—As early as 1661 the gardener of George Heriot's Hospital in Edinburgh had been directed to plant all kinds of "phisical, medicinal, and other herbs," but in 1670 Sir Robert Sibbald (born 1641), who was afterwards first professor of Medicine at the University of Edinburgh and first president of the Royal College of Physicians, together with his friend Dr. Andrew Balfour, developed (1) a small "Medicine Garden" in the Abbey gardens, and in 1677 they founded (2) the Town Garden at Trinity Hospital, both of which were placed in charge of James Sutherland, who in 1683 published Hortus Medicus Edinburgensis; or a Catalogue of the Plants in the Physical Gardens at Edinburgh. In 1702 (3) the University Garden was established at "Kirk o'Fields," and all 3 gardens, though independent, were in control of Sutherland, who was also professor of Botany in the Town College. In recent years Thomas Fairgrieve (1819-1893) had a drug-plant garden at Ormiston, and John Duncan a large collection of medicinal plants under cultivation where St. Peter's Church now stands. The most modern drug-plant garden in Edinburgh is that of Duncan, Flockhart & Co. (1915), just across the way from the Royal Botanic Gardens. They are growing commercially aconite, belladonna, colchicum, foxglove, henbane, poppies, roses, stramonium, and valerian. Among the experimental crops are broom, calendula, conium, chamomile, dandelion, elder, fennel, juniper, licorice, timothy grass, veratrum, and male fern. The author gives many details in regard to Sibbald and Sutherland, and much attention to the modern methods of cultivation, soil and manurial requirements, manner of collection, drying and preservation, and commercial success of the various drug crops.—*E. N. Gathercoal.*

659. HERRINGTON, ARTHUR, AND J. W. ELLIOTT. William Robinson, the man and his work. Garden Mag. 31: 253-257. *Illus., including portrait.* 1920.—"The work that he has done," is by Herrington; and "His gardens at Gravetye Manor," by Elliott.—*M. F. Warner.*

660. HUFFEL, GUSTAVE. Dénominations anciennes de nos forêts. [Former terminology of our forests.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 267-273. 1920.—A list of terms applied to forests by the French in the feudal period is given with brief descriptions of their origin and use.—*S. T. Dana.*

661. JERMSTAD, A. Ueber Carl von Linnés Beziehungen zur Pharmazie und zu den Apothekern. [On Carl von Linne's connection with pharmacy and apothecaries.] Schweiz. Apoth. Zeitg. 58: 533-536. 1920.—The work of Linnaeus as inspector of pharmacies, and his continued interest in the advancement of the profession are discussed. In 1741 he published a list of the native medicinal plants of Sweden which ought to be familiar to the pharmacist, and the Pharmacopoea svecica I (1775) was largely due to his instigation. He recommended the cultivation in Sweden of foreign medicinal plants, not in the botanical gardens, but on a large scale in physic gardens. Ferber, a pharmacist of Karlskrona, had such a garden at Agerum, and published an index of about 400 plants grown there under the title: Hortus Agerumensis (1739), said to be the first work printed in Sweden in which the Linnaean sexual system was employed.—*M. F. Warner.*

662. LE LECTIER. Catalogue des arbres cultivez dans la verger et plan du Sieur Le Lectier procureur du roy à Orléans. M.DC. XXVIII. [The catalogue of fruit trees of Le Lectier.] 15 X 12 cm., 35 + 1 p. Privately printed [for E. A. Bunyard: Maidstone, England, 1920.]—The catalogue is printed from a transcript made by M. Gibault of the French national horticultural society, from the original in the Bibliothèque Nationale, Paris, which is supposed to be unique. It also appeared in Jour. Pomology 1: 242-252, 1920, under English title as above. A long list of varieties grown by an amateur in the early 17th century, comprising pears classed according to season, apples, plums, cherries, peaches, figs, and other fruits.—*L. H. MacDaniels.*

663. LISTER, GULIELMA. Sir Edward Fry. Proc. Linn. Soc. London 131: 53-54. 1919.—Eminent as lawyer, judge, and arbitrator, he was strongly interested in botany from his boyhood days, and published British Mosses (1892 and 1908), and with his daughter, Agnes, The Mycetozoa (1899), and The Liverworts (1911). He was born Nov. 4, 1827, and died Oct. 18, 1918.—*M. F. Warner.*

664. MITCHELL, DONALD. Note on medicinal plant cultivation at Inverness: an old Highland pharmacist's experiences. Pharm. Jour. 106: 232-233. 1921.—About the beginning of the 19th century there were at least 3 physic gardens in the immediate vicinity of Inverness. In 1808 peppermint was extensively cultivated. The oil of peppermint was obtained by distillation and sold in the wholesale market. The collection of bearberry leaves (*Arctostaphylos Uva-ursi*) was also a considerable industry near Inverness at this time, and dandelion root was collected and an extract prepared from it.—*E. N. Gathercoal.*

665. OBERLY, E. R. List of literature on phytopathology. Phytopathology 11: 101. 1921.—In view of the discontinuance of this list, the bi-weekly list of current literature prepared in the Bureau of Plant Industry Library is offered to members of the Phytopathological Society.—*B. B. Higgins.*

666. PAYNE, C. H. A strawberry bibliography. Jour. Pomology 1: 235-242. 1920.—A list is presented of nearly 100 titles, arranged as American, English, French, and German works, exclusive of articles in periodicals.—*L. H. MacDaniels.*

667. PRUESSNER, A. H. Date culture in ancient Babylonia. Amer. Jour. Semitic Lang. and Lit. 36: 213-232. 1920.—The author presents documentary material from the Code of Hammurabi, contract literature, and the Babylonian Talmud, showing requirements imposed upon the tenant or cultivator, data on methods of planting, care of trees, process of pollination, returns from and value of date orchards in the Hammurabi period.—*M. F. Warner.*

668. SEWARD, A. C. Prof. A. G. Nathorst. *Nature* 107: 112-113. 1921.—Alfred Gabriel Nathorst, who died at Stockholm, Jan. 20, 1921, at the age of 70, was director of the Paleobotanical Museum of the Swedish Academy for the greater part of his life. He discovered many new generic types of special interest from the point of view of evolution (*Pseudobornia*, *Lycostrobus*, *Cephalotheca*, *Wielandiella*, *Cycadocephalus*, *Camptopteris*); carried out explorations in Spitzbergen and other arctic countries, and published numerous papers on the Rhaetic floras of Scania. "It is to Nathorst more than any other man that we owe our knowledge of Arctic floras extending from the Devonian to the late Tertiary period." A lovable personality and delightful companion.—O. A. Stevens.

669. TUCKER, E. M. Bibliographical notes. *Jour. Arnold Arboretum* 2: 181-184. 1921.—The dates of publication of the volumes of *Nouveau Duhamel* and of the parts of *Torrey & Gray, Flora of North America*, and other bibliographical notes on these 2 works are given.—Alfred Rehder.

670. WHETZEL, H. H. The Phytopathological Society of France. *Phytopathology* 11: 100-101. 1921.

671. WILSON, E. H. The romance of our trees. *xvi + 278 p., 45 pl., incl. front.* Doubleday, Page & Co.: Garden City, New York, 1920.—A series of popular essays on interesting trees; their varieties, history, literary and legendary associations; with special chapters on the ginkgo, cedar of Lebanon, yew, horsechestnut, magnolias, beech, nut and fruit trees, Lombardy poplar, and Babylon willow, part of which were also published in the *Garden Magazine*, 1919-20 [see *Bot. Absts.* 6, Entries 1471, 1472, 1473, 1876, 1877].—M. F. Warner.

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ALFRED GUNDERSEN, *Assistant Editor*

(See also in this issue Entries 818, 864, 998)

672. ANONYMOUS. [Rev. of: BEVIS, J. F., and H. J. JEFFREY. *British plants: their biology and ecology. 2nd ed., xii + 345 p., 115 fig.* Methuen & Co.: London, 1920.] *Sci. Prog.* [London] 15: 670-671. 1921. [See also *Bot. Absts.* 9, Entry 676.]

673. ANONYMOUS. [Rev. of: DENSMORE, H. D. *General botany for universities and colleges. xii + 459 p., 289 illus.* Ginn & Co.: London and New York, 1920.] *Sci. Prog.* [London] 15: 668-669. 1921.—"The matter is written in an interesting style . . . the illustrations, too, are good, and the diagrams especially exhibit a quite unusual standard of conception." [See also *Bot. Absts.* 9, Entry 679].—J. L. Weimer.

674. ANONYMOUS. [Rev. of: FRITCH, F. E., and E. J. SALISBURY. *An introduction to the structure and reproduction of plants. viii + 458 p., 230 fig. & illus.* G. Bell & Sons: London, 1920.] *Sci. Prog.* [London] 15: 671-672. 1921.

675. ANONYMOUS. [Rev. of: JONES, W. N., and M. C. RAYNER. *A text book of plant biology. viii + 262 p., 6 pl., 36 fig.* Methuen & Co.: London, 1920.] *Sci. Prog.* [London] 15: 672. 1921.

676. B., W. E. [Rev. of: BEVIS, J. F., and H. J. JEFFREY. *British plants: their biology and ecology. 2nd ed., xii + 345 p., 115 fig.* Methuen & Co.: London, 1920.] *Nature* 107: 71. 1921. [See also *Bot. Absts.* 9, Entry 672.]

677. BAKER, RICHARD T. Scientific names for commercial timbers. *Nature* 107: 45. 1921.—Instances are cited where the scientific names have been put into general use in Australia.—O. A. Stevens.

678. BRUNNHOFER, A. VON. Verwaltungsrecht und Holzhandel—zwei Vorlesungen die an der Schweizer. Techn. Hochschule gehalten werden sollten. [Administration and timber sales—two subjects that should be taught in the colleges of Switzerland.] Schweiz. Zeitschr. Forstw. 72: 142–146. 1921.—The timber sale policy should be placed on a uniform basis, especially stumpage prices. At present, each community sells to its own advantage at the expense of the general market. Strong courses in these subjects would create a uniform method and bring about application. Courses should be strengthened in practical road building, special chemistry, soil studies, bacteriology, geology, field excursions, and practical forestry.—J. V. Hofmann.

679. D., M. New American text books of botany. [Rev. of: DENSMORE, HIRAM D. General botany for universities and colleges. xii + 459 p.; Laboratory and field exercises for general botany. viii + 199 p. Ginn and Co.: Boston and London, 1920.] Nature 107: 69–70. 1921.—The reviewer finds the text lacking in continuity and balance. "Figure 146, which purports to be *Amanita muscaria*, is clearly a *Coprinus*." The section on seasonal life of certain common plants is a good feature. [See also Bot. Absts. 9, Entry 673.]—O. A. Stevens.

680. GAGER, C. STUART. Tenth annual report of the Brooklyn Botanic Garden, 1920. Brooklyn Bot. Gard. Rec. 10: 23–81. 1921.—The report contains a résumé of the 1st decade of the Botanic Garden, as well as data for 1920. Reports of heads of departments, and a financial statement are included; also a bibliography of publications of members of the staff, and, as Appendix 6, the Agreement between the Ecological Society of America and the Brooklyn Botanic Garden concerning the publication of the journal, Ecology.—C. S. Gager.

681. K., F. Plant biology. [Rev. of: JONES, W. NEILSON, AND M. C. RAYNER. A text book of plant biology. viii + 262 p., 6 pl. Methuen and Co.: London, 1920.] Nature 107: 37–38. 1921. [See also Bot. Absts. 9, Entry 675.]

682. NEWMAN, L. F., AND H. A. D. NEVILLE. A course of practical chemistry for agricultural students. Vol. I. 235 p. University Press: Cambridge, 1920.—Laboratory exercises are given with blank pages for notes interleaved. Vol. I is intended to cover the 1st year's course on the chemistry and physics of the soil; it comprises 43 chapters and an appendix of tables of constants and analyses. Volumes II and III are announced to follow.—C. S. Gager.

CYTOLOGY

GILBERT M. SMITH, *Editor*

GEORGE S. BRYAN, *Assistant Editor*

(See also in this issue Entries 731, 1033)

683. ARLOING, F., ET G. RICHARD. Sur la coloration vitale des corpuscules métachromatiques du Bacille diphtérique. [Intravital staining of the metachromatic corpuscles of the *Bacillus* of diphtheria.] Compt. Rend. Soc. Biol. Paris 83: 267–269. 1920.—The granules of *Corynebacterium diphtheriae* react as metachromatic bodies when sufficient Nile Blue to give a barely perceptible tint is added to a hanging drop culture. The bodies of the bacterial cell are stained light blue and the granules rose colored or mauve or violet in 5–15 minutes. The bacteria remain alive in this dilute stain for many hours and appear normal.—E. A. Bessey.

684. ARMAND, L. Les phénomènes nucléaires de la cinèse hétérotypique chez le *Lobelia urens* et chez quelques Campanulacées. [The nuclear phenomena in the heterotypic mitosis of *Lobelia urens* and in other Campanulaceae.] Compt. Rend. Acad. Sci. Paris 172: 762–764. 1921.—A study of the stages in synapsis and the heterotypic division of the nuclei of the Campanulaceae is reported. Parasynapsis is not found to occur. A simple longitudinal spireme

is found which breaks up into n in place of $2n$ number of elements. The 2nd synaptic contraction takes place in the typical fashion.—C. H. Farr.

685. CUTLER, D. W. The cytological problems arising from the study of artificial parthenogenesis. *Sci. Prog.* [London] 15: 435-444. 1921.

686. DANGEARD, P. A. Vacuome, plastidome et sphérome dans l'*Asparagus verticillatus*. [The vacuomes, plastidomes, and spheromes of *Asparagus verticillatus*.] *Compt. Rend. Acad. Sci. Paris* 171: 69-74. *Fig. 1-16*. 1920.—The vacuome is shown to be a permanent portion of the cell, sometimes appearing as metachromatin and sometimes as vacuoles. Anthocyan is formed in the vacuoles and not in the plastids. Likewise, the plastidome may be in the form either of mitoplasts or plastids. The spherome is composed of microsomes.—C. H. Farr.

687. EMBERGER, L. Étude cytologique des organes sexuels des Fougères. [A cytological study of the sex organs of ferns.] *Compt. Rend. Acad. Sci. Paris* 171: 735-737. 1920.—The paper reports on a mitochondrial study of the prothallia of ferns. During the formation of the sperm mother-cells the chloroplasts become transformed into chondriocents. In the sperm itself the mitochondria are all granular. A similar transformation occurs in the egg. The fertilized egg has the same chondriosomal appearance as the apical cell of the stem.—C. H. Farr.

688. GUILLIERMOND, A. A propos de la constitution morphologique du cytoplasme. [Concerning the morphological constitution of the cytoplasm.] *Compt. Rend. Acad. Sci. Paris* 172: 121-124. *Fig. 1-8*. 1921.—A résumé is presented of the study of mitochondria in animals, fungi, and green plants. The author reiterates his former contention that there are 2 kinds of mitochondria in green plants, one of which is concerned with photosynthesis. In addition to these there are in the cytoplasm the fatty granules and the vacuoles.—C. H. and W. K. Farr.

689. GUILLIERMOND, A. Observation vitale des chondriome des champignons. [Observations of the chondriome in living fungi.] *Compt. Rend. Soc. Biol. Paris* 83: 404-408. *Fig. 1-11*. 1920.—In young growing unstained mycelia of *Endomyces Magnusii* careful observation shows nuclei, minute fat drops, vacuoles, and elongated thread-like chondriomes. Staining *intra vitam* with Dahlia Violet in very dilute solution shows that these chondriomes have a granular structure. In the older filaments the small vacuoles enlarge and fuse into larger vacuoles without modification of the chondriomes, which have no connection with them. Fixation with Fleming's solution, with acetic acid omitted, and staining with Fuchsin shows that the chondriomes are unchanged.—E. A. Bessey.

690. GUILLIERMOND, A. Sur la coexistence dans la cellule végétale de deux variétés distinctes de mitochondries. [The existence of two sorts of mitochondria in plant cells.] *Compt. Rend. Soc. Biol. Paris* 83: 408-411. *Fig. 1*. 1920.—In the meristem of root tips of peas chondriomes are present as filaments, short rods, or granules, that are all alike in staining and other characters. In the plerome and periblem there are bodies that stain less heavily, and which remain of chondriome nature, and bodies that stain heavily and elaborate starch grains. In the sporangia and other parts of the fern the chloroplasts also are similar to these heavily staining chondriomes and many lose their chlorophyll and become smaller and reduced to typical chondriomes. The author considers that plastids are usually (but not always) enlarged forms of these more heavily staining chondriomes.—E. A. Bessey.

691. GUILLIERMOND, A. Sur la métachromatine des champignons. [The metachromatin of fungi.] *Compt. Rend. Soc. Biol. Paris* 83: 259-263. *1 pl.* 1920.—In the vacuoles of various fungi, *intra vitam* staining reveals small granules of metachromatin, which may increase in size under the influence of certain stains (e.g., neutral red). Sometimes these appear without staining as more refringent bodies in the vacuole. Evidently the metachromatin is mostly in solution but is precipitated out by the action of certain stains, changes in acidity, etc.—E. A. Bessey.

692. GUILLIERMOND, A. Sur l'origine des vacuoles dans les cellules de quelques racines. [The origin of the vacuole in the cells of some roots.] Compt. Rend. Soc. Biol. Paris 83: 411-414. Fig. 1-10. 1920.—In living rootlets of barley observed in an isotonic sugar solution the cells near the tip contain very numerous, elongated refractive filaments resembling chondriocents that can be colored by *intra vitam* staining with Neutral Red or Nile Blue. In older cells they contract and enlarge and eventually anastomose or fuse to become true vacuoles, the staining becoming fainter as if the stainable substance were becoming diluted. Fixation and staining shows the chondriomes in the cells even where the vacuoles are already well developed. In certain plants, such as gourd, root tips fixed and stained by REGAUD's method show true chondriocents and mitochondria in addition to these vacuole-producing bodies. The author doubts whether the latter really ought to be considered as of chondriosomal nature. These, not the true chondriosomes, are the structures DANGEARD has studied by *intra-vitam* staining methods.—E. A. Bessey.

693. HERRERA, A. L. Artificial cells. Sci. Amer. Monthly 3: 221-222. Fig. 1-3. 1921. [Translated from La Nature (Paris), July 31, 1920.]—An account is given of some experiments seeking to imitate natural cells. Artificial cells thus produced exhibited all the morphological characteristics of cell wall, cytoplasm, nucleus, and even mitotic division.—Chas. H. Otis.

694. JANSSENS, F. A. Observations sur les mouvements des flagelles de la *Polytoma uvella* (Ehrenb.). [Observations on the movements of the flagella of *Polytoma uvella*.] Compt. Rend. Soc. Biol. Paris 83: 296-299. Fig. 1-14. 1920.—The 2 flagella pointing straight forward make a sudden sweep of nearly 180°, making thus a sharp curve at the point of attachment. This curve progresses up the flagellum so that the recurved portion becomes shorter and shorter and the forward pointing portion longer until the original position is reached.—E. A. Bessey.

695. KIHARA, HITOSHI. Über cytologische Studien bei einige Getreide-Arten, Mitteilung III. Über die Schwankungen der Chromosomenzahl bei den Speciesbastarden *Triticum*-Arten. [Cytological studies on some wheat species. III. Concerning the fluctuation of the chromosome number in *Triticum* species hybrids.] Bot. Mag. Tôkyô 35: 19-44. Pl. 1. 1921.—The author described chromosome behavior in F_2 , F_3 , and F_4 of crosses between *T. polonicum* ($x = 14$) female and *T. spelta* ($x = 21$) male. He assumes that the F_1 hybrid ($2x = 35$), owing to the specificity of individual chromosomes, would form functional gametes only when the gamete contains either a complete set of 21 *spelta* or 14 *polonicum* + *i* (isolated or unpaired) *spelta* chromosomes. Fertilization of 14 + *i* gametes with one another gives *polonicum*-like plants, in whose meioses the *i* (isolated or unpaired) chromosomes tend to lag behind and be left out of the homeotypic nuclei. Succeeding generations tend to return to the *polonicum* type with 28 chromosomes. Gametes with 21 *spelta* chromosomes may fuse with one another or with 14 *polonicum* + *i* *spelta* and give rise to *spelta*-like plants. A thorough study of the descendants of one F_2 hybrid with 38 chromosomes (17 bivalents + 4 isolated) showed plants with 38, 39, 40, and 41 chromosomes only. A plant in another series showed 42. This 38-chromosome plant formed gametes with 17, 18, 19, 20, and 21 chromosomes. As shown above, however, only such combinations were viable as arose when one gamete had a full complement of 21 *spelta* chromosomes. Examination of the meiotic figures of these descendants showed invariably 17 pairs + 4 *i* (38), 18 pairs + 3 *i* (39), 19 pairs + 2 *i* (40), 20 pairs + 1 *i* (41), or 22 pairs. No plants were found with 34, 35, 36, 37 or any chromosome combinations other than those specified above. The paper is accompanied by unusual photomicrographs of meiotic figures and contains a discussion of the probable application of the author's conclusions to the facts uncovered in *Oenothera* by GATES, STOMPS, LUTZ, GEERTS, and others.—Leonas L. Burlingame.

696. KYLIN, HARALD. Bemerkungen über den Bau der Spermatozoiden der Fucaceen. [Observations concerning the structure of the sperms of Fucaceae.] Ber. Deutsch. Bot. Ges. 38: 74-78. Fig. 1-2. 1920.—RETZIUS and MEYES' observations on the structure of *Fucus*

sperms are briefly stated. MEYER was not in agreement with the findings of Kylin (1916) on the same subject, a fact which led Kylin to review his work. He investigated the sperms of *Fucus Areschougii* killed with ALTMAN's mixture, stained with rosanilin, and preserved in potassium acetate solution. This revealed a red colored "plastomere" at the rear of the chromatophore; and in front of it a light red-colored granule, the "blepharoplast," from which spring the 2 cilia. Staining with haemalum shows the blue-staining nucleus, lying opposite the "blepharoplast." The author states that the chromatophore first develops as a leucoplast.—N. L. Gardner.

697. LITARDIÈRE, R. DE. Le dimorphisme des éléments chromosomiques chez le *Polypodium Schneideri* pendant les périodes de télophase et d'interphase. [The dimorphism of the chromosomes of *Polypodium Schneideri* during the periods of telophase and interkinesis.] *Compt. Rend. Acad. Sci. Paris* 172: 607-608. 1921.—*Polypodium Schneideri* is a hybrid between *P. aureus* and *P. vulgare* var. *cornubiense*. Two sets of chromosomes appear in the telophase and persist during interkinesis, but during the prophase the heteromorphic nature of the chromosomes disappears and in the metaphase very little difference can be seen between them.—C. H. Farr.

698. MANGENOT, G. Sur le chondriome et les plastes dans l'antheridie des Fucacées. [The chondriome and plastids in the antherids of Fucaceae.] *Compt. Rend. Soc. Biol. Paris* 83: 275-276. *Fig. 1-5*. 1920.—The plastids in the cells destined to become the antherids divide by simple fission until they are numerous. At the same time the nuclei are dividing. The plastids become paler, more elongated, and finally reach the state of true, almost colorless chondriocysts that later become red-orange in color and fusiform in shape and lie appressed, 1 to each nucleus, forming the red point of the future antherozoid. The granular mitochondria remain unchanged during this plastid change, grouping themselves in groups of 5-8 in the vicinity of each nucleus.—E. A. Bessey.

699. MANGENOT, G., ET L. EMBERGER. Sur les mitochondriens dans les cellules animales et végétales. [Mitochondria in animal and plant cells.] *Compt. Rend. Soc. Biol. Paris* 83: 418-420. *Fig. 1-6*. 1920.—The cells of the liver and kidney of the frog and of the root of a fern (*Anthyrium*) fixed and stained by REGAUD's method show similar mitochondria,—rods, filaments, and granules. The authors believe these structures are homologous. They differ from the vacuole-producing bodies of similar appearance in that they do not stain intravitaly. The chondriome and vacuome systems are distinct.—E. A. Bessey.

700. MÖBIUS, M. Über die Grösse der Chloroplasten. [On the size of chloroplasts.] *Ber. Deutsch. Bot. Ges.* 38: 224-232. 1920.—The author presents in tabular form his measurements of the greatest diameter of the chloroplasts of 215 species, including a number of algae, liverworts, and mosses in addition to 206 vascular plants. Half of the plants in this list have chloroplasts 5 μ in diameter and 75 per cent of them have chloroplasts between 4 and 6 μ in diameter. There is little evidence of any relation between size and systematic position. The range within the Nymphaeaceae (*Victoria regia* 7-10 μ and *Nelumbium speciosum* 4-5 μ) is almost as great as the range (3-10 μ) in all plants examined. No relation exists between the size of cells, size of leaves, texture of leaves, or habitat of the plant and the size of the chloroplasts. Excluding succulent water plants the herbaceous plants generally have larger chloroplasts than woody ones, possibly because of the relatively smaller water content of the leaf cells of woody plants. The relatively constant size of the nucleus throughout the plant kingdom is that which is most favorable for the molecular adsorption force by which, according to WILLSTÄTTER, the chlorophyll pigment is held on the framework of the chlorophyll grain. This constancy of size of the chloroplast he contrasts with the wide range in size of mature parenchyma cells (.01-.09 mm.) and of nuclei (in monocotyledons 2.5-17 μ).—R. M. Holman.

701. SEIFRIZ, WILLIAM. Observations on some physical properties of protoplasm by aid of microdissection. *Ann. Bot.* 35: 269-296. 1 *fig.* 1921.—A discussion is presented of the

knowledge of cellular organization obtained by direct dissection of living material with CHAMBER'S modification of the BARBER apparatus. The material studied included plants from most of the great groups, as well as protozoa and other animals. Plasma membranes differing in physical and probably chemical structure are found on all protoplasmic surfaces and may be removed by direct dissection. The plasma membrane has a thickness of about $\frac{1}{10}$ μ . Vacuolar and nuclear membranes may also be removed in the same manner. These microdissections are possible because of the immiscibility of protoplasm, using the term in its broadest sense, with water—an immiscibility which is due to the colloidal nature of the living substance as contrasted with the miscibility of water with protoplasm when the latter is dead or near death. Since there is this immiscibility with water the absorption of water is considered an imbibition process.—*Gilbert M. Smith.*

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

J. H. HOFMANN, *Assistant Editor*

(See also in this issue Entries 660, 671, 677, 678, 878, 955, 969, 983, 1092)

702. ANONYMOUS. Brændespørgsmaalet og Dansk Skovforenings Stilling dertil. [The fuel situation and the position of the forestry association on this question.] Dansk Skovforenings Tidsskr. 5: 265-286. 1920.—Reports and recommendations of the Danish Forestry Association relative to utilization, prices, laws and regulations, administration, and standards of measurement are presented.—*J. A. Larsen.*

703. ANONYMOUS. Die Waldverhältnisse Griechenlands. [The forest conditions of Greece.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 310-311, 317, 319. 1920.—In ancient Greece the forests covered a large area; at present only about $\frac{1}{3}$ of this area is forested, due to clearing of the land for agriculture, fire, and grazing. This devastation began when a fanatical Christianity destroyed first the sacred groves and later extended its work to the mountain forests, which were regarded as haunts of pagan gods.—Oak, the most prominent genus in ancient Greece, is still supreme, with 15 species recognized. *Quercus conferta* and *Q. robur* are most frequent, but others are also widely scattered. Beech (*Fagus silvatica*) is second in importance to the oaks, followed by chestnut (*Castanea vesca*). Other hardwoods play minor rôles, including 2 species of elm (*Ulmus campestris* and *U. effusa*), 3 species of poplar (*Populus alba*, *P. nigra*, and *P. tremula*), 6 of maple (*Acer campestre* being the most prominent, followed by *A. creticum*, *A. monspessulanum*, *A. platanoides*, *A. reginae amaliae*, and *A. ricinifolium*). Alder (*Alnus glutinosum*) is found sparingly, as are also 2 ashes (*Fraxinus ornus* and *F. excelsior*) and sycamore (*Platanus orientalis*). Seven species of willow are found (*Salix alba*, *S. caprea*, *S. cinerea*, *S. fragilis*, *S. incana*, *S. purpurea*, *S. triandra*). Among conifers the Apollo fir (*Abies apollinis* or *A. parnassica*) is most important, yielding timber and a healing balsam. Amalia fir (*Abies reginae amaliae* or *Arcadica*) is also found, together with *A. panachaica* and *A. cephalonica*. This last species has suffered much from destructive lumbering during the past century but still occupies an area of about 12,000 hectares in the Aenos mountains. *Pinus laricio*, which goes by several popular names, is widely scattered throughout the mountains of Greece, usually in mixture with fir; it is widely used in ship-building. *Pinus maritima* is found near the coasts and on many islands and is frequently tapped for its resin. A 3rd species of pine, *Pinus pinea*, is now rather rare. It is famous for the flavor of the nuts. *Juniperus oxycedrus* and *J. macrocarpa* are found scattered throughout the mountains of Attica, while *J. communis*, *J. drupacea*, *J. nana*, *J. phoenicea*, and *J. turbinata* are found only in the Peloponnesus and some of the islands. *J. foetidissima* is the only species forming pure stands. A general forest description of Mount Pentelicus is given. The organization of Greek forest administration is briefly outlined. The field organization fails to equal the "paper" organization and in general the work is not very well handled and Greece is to be classed as backward in forestry although progress is being made. As a result

of a recent Austrian mission to Greece under Dr. STENGEL a higher forestry school has been founded at Athens, and a corps of men has been built up for torrent control work. The new laws provide further for the encouragement of private forestry, revise the whole state organization along modern lines, and provide for forest fire protection. The Austrian mission has also initiated growth and volume studies on the firs of Greece.—*F. S. Baker.*

704. ANONYMOUS. Price list of forest-tree transplants, ornamental shrubs, hedge plants and seeds obtainable from the forest nursery, Salisbury. Rhodesia Agric. Jour. 17: 554-555. 1920.—Conditions under which shipments of young trees are made are stated. Forest tree transplants when ordered in quantities are grown and shipped in tins containing 4 to 25 plants in a tin. Prices of transplants and of seeds are given for a number of species.—*A. J. Pieters.*

705. ANONYMOUS. Terpentinöl, Harz und Fett aus einheimischen Nadelhölzern. [Turpentine, rosin, and fat from native conifers.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 325-326. 1920.—The author discusses recent articles dealing almost entirely with the extraction of resinous materials from wood chips, sawdust, etc., by distillation.—*F. S. Baker.*

706. ALGAN, H. [Rev. of: HUFFEL, G. La forêt sainte de Haguenau en Alsace. [The sacred forest of Haguenau in Alsace.] 6 fig. Berger-Levrault: Nancy, Paris, and Strasbourg, 1920.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 289-296. 1920.

707. BALME, JUAN. Repoblando nuestro bosques, tendremos agua. [Conserve the water supply by reforestation.] Rev. Agric. [Mexico] 5: 522-525. 3 fig. 1920.—The Mexican forests are being rapidly cut to supply ties for the railroads and other demands for forest products. A plea is made for reforestation. *Eucalyptus* species are especially recommended for this purpose.—*John A. Stevenson.*

708. BARBEY, A. Die Rindenlaus der Weissstanne. [The bark louse of the white fir.] Schweiz. Zeitschr. Forstw. 72: 147-151. 1 pl. 1921.—It was generally conceded that the mixed forests and local groups of individual species in Switzerland were less subject to insect attack than the large areas of pure stands in Germany or Russia. However, during the past season alarming attacks of *Dreyfusia piceae* C. B. (*Chermes piceae* Ratz.), a relative of the German *Dreyfusia Nusslii* C. B., were noted in Jura and Aargau. The insect attacks the bark near the middle of the bole and farther up (also the smaller branches), causing drying and splitting of the inner bark and exudation of pitch. The tree finally dies, apparently from the drying of the wood rather than from the loss of leaves. The life history is not completely known. The spring form consists of dormant larvae and wingless females, and the summer form may be either the typical summer form or the migratory form of the female. A known remedy is to spray the summer form with a mixture of 1400 parts water, 30 of nicotine, and 100 of soap. The height at which the attacks are most serious makes spraying impracticable.—*J. V. Hofmann.*

709. BILLMANN, H. H. Nogle Bemærkninger om Jordbearbejdning med Motorkraft. [Notes on working the soil with motor power.] Dansk Skovforenings Tidsskr. 5: 226-230. Pl. 2. 1920.

710. ENGLER, ARNOLD. Untersuchungen über den Einfluss des Waldes auf den Stand der Gewässer. [Investigations to determine the influence of forests on stream flow.] Mitteil. Schweiz. Zentralanst. Forst. Versuchsw. 12: 1-626. 58 pl., 127 tables. 1919.—The importance of the relation of forests and run-off has long been recognized. The effects of the forest have been noted in various localities, although the specific relations of complete forest cover, partial cover, and denuded areas were not determined. The objects of this experiment were to determine the comparative run-off on a forested area and a non-forested area, with all other conditions as nearly equal as possible during (a) heavy showers, cloud bursts, (b) continuous long periods of rain, (c) rapid melting of snow, and (d) periods of drouth. The experiment includes 2 watersheds known as the Sperbelgraben and the Rappengraben. The former

contains 137 acres and has a complete forest cover on 97 per cent of the area, and the latter contains 172 acres, of which 35 per cent is covered with forest and shrubs, 26 with willow, and 29 with alpine alder and spruce in meadows; 8 per cent is in meadow and 2 under cultivation. Soil, vegetation, slope, elevation, springs, and all noticeable factors were considered. The elevation varies from 912 to 1261 meters. On each watershed 3 rain gauges were placed at different elevations with a snow stake at each station. In addition, 8 snow stakes were established in 1915, 4 on shaded slopes and 4 on sunny slopes. They were grouped in pairs under mature conifers and hardwoods and young growth. These stakes were read twice each week at 8-9 in the morning. Temperatures were recorded at the stations of Kurzenealp and Riedbad. Thermometers were placed on the shaded side of wooden buildings and read 3 times daily. Stream flow was recorded automatically at each control station from April 16 to November 30 of each year. The automatic recorders could not be depended upon during freezing weather. Variations in underground drainage or supply of water are considered negligible. The springs of the Rappengraben area (non-forested) are slightly stronger and more constant. However, the run-off from the forested area (Sperbelgraben) was greater during the dry summer periods than that of the non-forested (Rappengraben) area. The records show a total of 4-5 per cent greater precipitation in the Rappengraben than in the Sperbelgraben; also, the former retained a cover of snow for 143 days, the latter only 121 days. These differences are attributed to the location of stations. The snow readings in the Rappengraben were taken in a cove and are considered due to local conditions. Water content of the soil in the Rappengraben was slightly less in summer and greater in the fall than in the Sperbelgraben. The retention of water in the dry season is attributed to porosity of soil and prevention of run-off due to soil looseness brought about by roots and forest animals; and the smaller amount of water in the soil of the forested area during wet seasons is attributed to the duff preventing absorption after the humus and duff are wet, thereby causing greater run-off.—Individual showers caused about 50 per cent more run-off on the Rappengraben than on Sperbelgraben and the duration of run-off on the non-forested area was shorter. Evaporation from the forest floor was 1230 cubic meters per hectare per year, and in the open 3690 per year. Transpiration from the forest per year per hectare was 3000 cubic meters, from the meadow and cultivated plants 1300, and from the willow areas 650. The disposition of precipitation is summed up in the following tabulation:

	<i>Sperbelgraben;</i> <i>per cent of Precipitation</i>	<i>Rappengraben;</i> <i>per cent of Precipitation</i>
Run-off.....	59.3	61.9
Evaporation from vegetation...	14.5	11.8
Transpiration.....	18.9	8.1
Evaporation from ground.....	7.3	18.2
	<hr/> 100.0	<hr/> 100.0

Erosion was greater in the non-forested area and the stream carried more silt.—J. V. Hofmann.

711. GAJÓN, CARLOS. Una Acacia rica en tanina. [An Acacia rich in tannin.] Rev. Agric. [Mexico] 5: 442-443. 3 fig. 1920.—A brief account is given of *Acacia pycnantha* Benth., including botanical description, cultural directions, and analyses of the bark.—John A. Stevenson.

712. HENNE, A. VON. Einiges über den verteuerten Waldwegbau. [Concerning the cost of forest road building.] Schweiz. Zeitschr. Forstw. 72: 129-140. 1921.—The cost of forest road building has increased about 33 per cent during the last 25 years. Although wages have increased as much as 92 per cent, transportation and other costs have increased only 23 per cent. Forest roads should be built with a view to permanency, not only for the regions that they traverse, but also as an outlet for adjoining regions and those farther back. Width should not be sacrificed for length, although narrow roads of 2 meters width are sufficient for winter sled roads. Wheel-traffic roads should be 2.5 meters wide with turnouts, or 3 meters wide. Rocky and gravelly places should not be covered with rock surface except on main highways.

Better satisfaction and cheaper construction can be obtained through the small contractor; the machinery of the large operator is too cumbersome and expensive.—*J. V. Hofmann.*

713. HUFNAGL, HANS. Eine schwedische Kubikmassen-Ermittlungsmethode. [A Swedish method for determining volume.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 331-332. 1920.—A brief discussion is given of Prof. TOR JONSON's form factor methods and their basis.—*F. S. Baker.*

714. KOPETZKY, EUGEN. Ein Vorschlag zur Beförsterungsfrage. [A suggestion for forest administration.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 243-244. 1920.—Owners of small woodlands are under considerable disadvantage in handling their holdings under the best methods of forestry and also in selling their products. The cure for this condition is frequently expressed as the "Nationalization" or "Socialization" of the forests. The author points out that the same ends may be accomplished through voluntary associations of small owners. Such associations might be loose at first and limited to cooperative purchases and employment of technical help. These associations, however, are capable of development into actual managers of the woodlands of the individuals on the basis of one large unit, thus securing every advantage that large forest owners have and also serving public interests much better. The formation of such associations can be stimulated by the extension of laws applying to large forests to small holdings, forcing them to unite for economical compliance with these laws.—*F. S. Baker.*

715. KRARUP. Sønderjydske Skovforhold. [Forest conditions in southern Jutland.] Dansk Skovforenings Tidsskr. 5: 217-226. 1920.—The author gives areas and general description of the forests in Schleswig-Holstein, territory recently acquired from Germany. The eastern forests are made up principally of beech, ash, and oak, with plantations of Sitka spruce and Douglas fir. In the central and western parts there is a predominance of red spruce and fir. These forests show the results of careless cutting incident to the demands of the war. Game animals are also considerably reduced.—*J. A. Larsen.*

716. KREIBICH, M. Kapitalstilgung. [Amortization.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 273-274. 1920.—Rules and formulae are presented for determining certain values frequently needed but not included in tabular form, from values which are so given in the forester's handbooks or "calendars" current in Germany.—*F. S. Baker.*

717. KREUTZER, E. Neue Durch-forstungsgrundsätze. [New principles in thinning.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 324-325. 1920.—In Württemberg it has been the practice of most private forest owners to thin stands, particularly fir, too lightly in an attempt to get a maximum number of stems per acre, and clear material rather than good crown development. This is intensified by the lack of a good market for poles removed in thinning. Crown width should equal $\frac{1}{4}$ the height of the tree on site quality I, $\frac{1}{6}$ on quality II, and $\frac{1}{8}$ on quality III. The factors, 7, 6, 5, used above are employed as spacing indicators from which the number of stems per unit area can be obtained by dividing the height of the trees by the appropriate "spacing indicator," and then dividing the area by the square of this quotient. The final yield in money depends upon basal area \times height \times form factor \times value quotient. In practice the term "height times form factor" can be eliminated as it is nearly constant and attention must be centered upon basal area and quality, which are dependent in turn upon the number of stems per hectare.—*F. S. Baker.*

718. LOCKER. Vorschläge zur Beförsterung. [Proposals for forest administration.] Wiener Allg. Forst- u. Jagd Zeitg. 39: 18-19, 24-25. 1921.—The function of forests is to furnish wood, also protection to the soil, etc. In order to do this all forests should be under administration. In considering plans to accomplish this, 3 classes of forests may be recognized: A. Large private forests having wood production as their chief object. B. Encumbered forests, belonging to associations, cities, common property, etc., in which the object of management is complex. C. Small wood lands (private). The first problem is personnel.

In forests of class A and B there should be a forester for every 600 to 5000 hectares, with an assistant for every 600 to 1500 hectares; while in class C forests, forester for every 5000-10,000 hectares is sufficient. In class A and B forests the plans of management as proposed by owners should be presented to District Foresters for approval, while in class C forests the government will initiate the plans. In the latter associations of forest land owners are very necessary to economical and easy administration. A full administration is outlined from State Forester down through various grades, together with councils of different degrees of authority. The distribution of costs of administration in different classes of forests and kinds of work is outlined.—*F. S. Baker.*

719. MUUS, F. Forsyndelser mod Skovnaturen ved vor Almindelige Skovdrift. [Sins against nature in our present forestry practice.] Dansk Skovforenings Tidsskr. 6: 1-16. Pl. 1. 1921.—The present way of managing the forests by even-aged stands and clear cutting is detrimental to production because: (1) The soil is too much exposed to sun and wind, thereby losing the natural vegetation, moisture, and loose texture of the soil; (2) the borders of the forests suffer injury by exposure to sun and wind; (3) the openings incident to clear cutting retard growth of the younger age classes; (4) in the older high forests too many trees lack suitable light or space for ideal development; (5) the present practice places too much emphasis on direct sunlight; the diffuse light, shelter, and increased moisture of the soil secured by selection cuttings give better results. It is known that the 1st rotation after clear cutting produces poorer, shorter trees than the 2nd rotation in a natural forest. The author cites excellent results obtained by selection and shelterwood methods at Polenzka-Börentshoren in Germany, where since 1884 this method has increased the yield of the forest from 1.5 to 3.3 cubic meters per hectare per year, and raised the quality of the site from IV to II.—*J. A. Larsen.*

720. MUUS, F. Meddelelse fra Handelsudvalget. [Report of the Department of Commerce.] Dansk Skovforenings Tidsskr. 5: 248-265. 1920.—Abstracts are presented dealing with prices, amounts, and general market conditions for lumber and fuel woods.—*J. A. Larsen.*

721. PODHORSKY, J. Der Wald als Regulator des Abflusses und Standes der Gewässer. [The forest as a regulator of the run-off of water.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 267-269. 1920.—The idea of control of torrential run-off by forests has been doubted lately in some quarters. The author undertakes to point out the definite advantages of run-off control through forests, by citing the work of the Swiss forest experiment station. The bulk of the article is a review of this work from the report of ARNOLD ENGLER [see Bot. Absts. 9, Entry 710].—*F. S. Baker.*

722. RAFFN, JOHANNES. Skovfrøanalyser i Säsonen 1919-20. [Analyses of forest tree seeds 1919-20.] Dansk Skovforenings Tidsskr. 6: 17-18. 1921.

723. RITTMAYER. Der Schutzwald. [The protection forest.] Wiener Allg. Forst- u. Jagd Zeitg. 39: 23-24. 1921.—The legal definitions of protection forests are reviewed and in all there is a clear intent to limit such forests to steep mountainous country where heavy cutting would result in avalanches, snowslides, and destructive erosion. The author proposes to extend the definition to cover all forest lands where reproduction is difficult, automatically restricting cutting in these lands to the degree allowed in the usual protection forests and thus assuring adequate reproduction. It is pointed out that many rocky, dry areas within forests are becoming treeless under present methods of cutting and are reforested only with extreme difficulty.—*F. S. Baker.*

724. S., A. Valeur d'avenir. [Future value.] Rev. Eaux et Forêts 59: 71-72. 1921.—In calculating the future value, as a basis for reparations, of trees destroyed by the Germans, it is helpful to make use of PRESSLER's famous trinomial ($a + b + c$), in which a represents the per cent of current volume growth of the tree, b the per cent of increase in quality resulting from increase in size, and c the per cent of increase in value resulting from rising prices

of wood. Trees over 40 cm. in diameter usually have no future value because for larger trees b is negative, making the sum of $a + b$ less than c . The great and definitely known increase in price during the last seven years, however, gives a positive future value to trees up to 60 cm. in diameter. In the case of young oak standards for this period c amounts to 15 per cent, to which may be added 2 per cent for current annual volume growth (a), making a total of 17 per cent even if b is ignored entirely.—*S. T. Dana*.

725. SAMMEREYER, HANS. Zirbenkulturen. [Swiss stone pine (*P. cembra*) culture.] Wiener Allg. Forst- u. Jagd Zeitg. 38: 332-333. 1920.—*Pinus cembra* has good possibilities for planting in the Tyrol region. The wood is in high demand for charcoal in local smelters and many high mountain forests have been devastated on account of this demand. Toward the upper range of fir and larch it is often difficult to get successful plantations, but the establishment of Swiss stone pine is easy, and larch and fir are later introduced with ease,—the stone pine is choked out in a few years. The real field of usefulness of the species is at higher elevations (above 1800 meters), where it is virtually the only species that develops rapidly. Planting is much superior to sowing on account of the abundance of rodents and birds which destroy the seed; but in exceedingly rocky sites a combination of sowing and planting seems best as seedlings can establish themselves among the rocks where holes cannot be dug. While this species succeeds in the open, it does much better in the protection of rocks, hummocks, and old stumps. Four to 6 year old seedling stock, as a rule raised in nurseries near the planting site, is generally used. Rodents and jays are the chief enemies of such nurseries; the former are combatted by the use of typhus bacilli, the latter by wooden lattice work over the beds.—*F. S. Baker*.

726. SIM, T. R. Timber trees for commercial culture. South African Jour. Indust. 3: 1030-1039. 1920.—A list is presented of trees that have been tried in Natal, with notes on success or failure.—*A. J. Pieters*.

727. VESTERGAARD, N. Dansk Skovforenings Opvisning af Skovmaskiner og Redskaber i Haslev-Orned Skov den 17. April 1920. [Demonstration of machinery for use in forestry operations at Haslev-Orned forest April 17, 1920. Under auspices of the Danish forestry association.] Dansk Skovforenings Tidsskr. 5: 231-247. Pl. 18. 1920.

728. WEIR, JAMES R. The mucilage of mistletoe berries as an adhesive. Phytopathology 11: 99. 1921.—A method is given for the preparation of mucilage from the berries of *Phoradendron*, *Viscum*, and related genera.—*B. B. Higgins*.

GENETICS

GEORGE H. SHULL, *Editor*

JAMES P. KELLY, *Assistant Editor*

(See also in this issue Entries 587, 594, 596, 598, 603, 613, 617, 627, 630, 639, 647, 685, 695, 697, 785, 789, 792, 807, 816, 823, 832, 840, 851, 871, 876, 941, 1100)

729. ANONYMOUS. Mutations and evolution. [Rev. of: GATES, R. Mutations and evolution. New Phytol. 19: 26-34, 64-83, 132-151, 172-188, 213-253. 1920.] Nature 107: 636-637. 1921.

730. ANONYMOUS. The pollination of *Incarvilleas*. [Rev. of: CUTTING, E. M. On the pollination mechanism of *Incarvillea Delavayi*, Franch. Ann. Botany 35: 63-71. 3 fig. 1921.] Gard. Chron. 69: 97. 1921.

731. AGAR, W. E. Cytology with special reference to the metazoan nucleus. xii + 224 p. Macmillan & Co.: New York and London, 1920.—A condensed general treatise on the subject indicated by the title is presented. The author contrasts parasynsinesis and telosynsinesis,

considering the former proven, the latter perhaps possible in some organisms. "Mutual relations of chromosomes" in syndesis are discussed, it being considered probable that homologous chromosomes fuse at this time. Syngamy, gonomery, and fragmentation of chromosomes are discussed; also parthenogenesis—facultative and obligatory, haploid and diploid. Cases are cited of diploid parthenogenesis with 2 maturation divisions (*Nematus*, *Rhodites*). Sex chromosomes in insects are considered in detail and compared with those of other animals. Special life histories are described; alternation of parthenogenetic and sexual generations are considered with reference to chromosome behavior. Relation between sex chromosomes and sex determination are briefly considered with the conclusion that in every individual "both sexes must be considered as potential," but in most cases sex chromosomes are "overwhelmingly the most important immediate factor in sex determination." In rare cases, "other factors may be more powerful." Actual influence of sex chromosomes in determining sex is unknown, but the result is probably not due to differences in the mass (amount) of chromatin. Sex is probably due to hereditary factors residing in the chromosomes. Evidence for genetic continuity of chromosomes is reviewed and the principle is accepted. Homology of chromosomes is discussed. Possible modes of evolution of chromosomes are considered, i.e., fractionation, fusion, tetraploidy, etc. The author reviews evidence indicating that chromosomes are the main vehicles by which "hereditary qualities are transmitted from parent to offspring," and that they initiate and control activities of cell and morphogenesis. A discussion of chromosomal behavior in hybrids is included; also a brief treatment of crossing over and mutation phenomena including somatic mutations. Morphogenesis is immediately affected by "organ-forming substances" of cytoplasmic nature, but is ultimately controlled by the nucleus. Chromidia are considered, with the conclusion that their origin is in doubt and their function not clear. Chondriosomes, which may be identical with chromidia, are likewise of doubtful origin; there is practically no evidence that they reproduce regularly by fission or that they are equally and regularly distributed in cell division. They are probably not the seat of morphogenetic factors, and are not, on the basis of present knowledge, to be considered as idioplasmic. The final chapter is devoted to nuclei of Protista and plants. Chromatin-cytoplasm differentiation may be lacking in some bacteria. "Modes of nuclear multiplication in the Protista are of bewildering variety." Recent evidence renders supposed cases of amitosis in Protista doubtful. Likewise the supposed non-qualitative divisions of chromatin by means of chromidia are somewhat doubtful. Polyploid nuclei occur in certain stages of some Protista; e.g., the radiolarian *Aulacantha* has one chromosome in some nuclei, over 1,000 in others; both types apparently carry a full set of hereditary factors. Meiotic phenomena in plants are essentially similar to those in animals. Differences between animals and plants are discussed, especially variations in prominence of haploid (gametophyte) generation in plants. [See also Bot. Absts. 7, Entry 850.]—C. W. Metz.

732. ALVERDES, FRIEDRICH. Zum Begriff der Scheinvererbung. [The concept of false heredity.] Zeitschr. Indukt. Abstamm.- u. Vererb. 25: 164-169. 3 fig. 1921.—The term "false heredity" is applied to a change produced in a line of descent by changed surroundings, which change remains for as many generations as the change in the surroundings persists so that the line of organisms comes back to normal only when, or a few generations after, the surroundings again become normal. Thus, non-heritable changes are classed as changes in the environment, and heritable changes as changes of the genotype. The problem of inheritance of acquired characters therefore becomes the problem of changes in the genotype produced by changes in the surroundings.—John Belling.

733. BANNIER, J. P. [Dutch rev. of: ALLEN, E. J., AND E. W. SEXTON. Eye-colour in *Gammarus*. Jour. Genetics 9: 347-366. 1 pl., 1 diagram. 1920 (see Bot. Absts. 7, Entry 840).] Genetica 3: 63-64. 1921.

734. BANNIER, J. P. [Dutch rev. of: JONES, D. F. Selective fertilization in pollen mixtures. Biol. Bull. [Woods Hole] 38: 251-289. 1920 (see Bot. Absts. 6, Entry 1699).] Genetica 3: 68-70. 1921.

735. BAUMANN, E. Zur Frage der Individual- und der Immunitätszüchtung bei der Kartoffel. [The question of individual selection and breeding for immunity in potatoes.] Fühlings Landw. Zeitg. 67:246. 1918.—An analysis of the difference in yield shown by 2 potato varieties, "Auf der Höhe" and "Industrie" is presented. Industrie was more consistent in yield, showing an average range in yield per plant in grams of 380 as compared with 580 for Auf der Höhe. This difference was ascribed to a lessened influence of environment on the former variety.—Differences in degree of resistance to diseases were also quite marked. Auf der Höhe was affected with chlorosis and *Phytophthora*, while Industrie showed curly-dwarf and mosaic; both varieties were affected with leaf roll. Diseased plants of Auf der Höhe, however, showed only about $\frac{1}{2}$ as much reduction in yield as diseased plants of Industrie when compared with healthy plants of the respective variety.—The author emphasizes the need of thorough study of the morphological and physiological characters of the numerous varieties on the market to determine the most resistant and highest-yielding ones.—C. M. Woodworth.

736. BAUR, E. [German rev. of: FRUWIRTH, C. Handbuch der landwirtschaftlichen Pflanzenzüchtung. Allgemeine Züchtungslehre der landwirtschaftlichen Kulturpflanzen. (Handbook of agricultural plant breeding. General genetics of agricultural plants.) xviii + 442 p., 8 pl., 89 fig. Parey: Berlin, 1920.] Zeitschr. Bot. 13: 313-314. 1921.

737. BECKER, WERNER H. Was wird aus den Kindern alter Erstgebärender? Ein Beitrag zur Vererbungslehre. [What becomes of the children of mothers who bear their first child late in life? A contribution to genetics.] Arch. Rass.- u. Gesellschaftsbiol. 13: 277-297. 1921.—Do the offspring of parents of advanced age possess a neuropathic constitution? Data were collected by mail from women (mothers) who had visited the clinic at Giessen University. Eighty-five were primipara, 35 years old or over; and of these 62 were married. Among the 85 there were 17 still births,—a rate about 6 times higher than that of all first births in Berlin (1898) (—WINKEL). The sex ratio was 47 males to 39 females. The birth weight was on the average slightly less than that of early first born. According to the answers to the questionnaire, 24 children were normal, 3 imbecile, 3 epileptic, and 7 psychopathic. The author gives 16 additional cases of histories collected from physicians. He considers briefly the biological meaning of his results, but draws no general conclusions. His data are presented in detail.—C. C. Little.

738. BLACKBURN, KATHLEEN B., AND J. W. HESLOP HARRISON. The status of the British rose forms as determined by their cytological behavior. Ann. Botany 35: 159-188. Pl. 9-10, 5 fig. 1921.—In the rose the fundamental chromosome number is 7. *Rosa arvensis* and *R. rugosa* are diploid types; *R. pimpinellifolia* and all of the Villosae are tetraploid; the Eucaninae, Afzelianae, Rubiginosae, and Tomentosae are pentaploid; and a hybrid of *R. pimpinellifolia* \times *R. tomentosa* var. *sylvestris* is found to be hexaploid. All of the diploid types examined are found to be of normal behavior during meiosis. Most of the tetraploid forms and all of the pentaploid and hexaploid ones show a partial reduction involving 14 or 28 chromosomes. In these groups the heterotypic division is equatorial as far as the bulk of its chromosomes is concerned but reductional with a fixed proportion, generally 14 and sometimes 28. The anaphase of the heterotypic division occurs in 2 steps, one involving the reduction and the other the splitting of the univalent chromosomes. In many cases the split univalent chromosomes fail to reach the poles, and form micronuclei. Multinucleate pollen grains are common in the anomalous forms of the genus. Known hybrids in many genera exhibit the same type of abnormal behavior as is shown by these forms of roses. The close similarity between the two leads the authors to the statement that every rose studied, showing partial reduction, is of hybrid origin. All of the abnormal roses are facultatively apomictical, and this is attributed to latent hybridity. Natural hybrids are instrumental in building new microgenes (Jordanian species) of the rose. [See also Bot. Absts. 9, Entry 745.]—A. C. Fraser.

739. BORING, EDWIN G. Predilection and sampling of human heights. Science 52: 464-466. 1 fig. 1920.—The author presents a distribution of the heights of 221,819 men (insurance data) and shows that the curve has a remarkable inversion near the peak, there being fewer

men of height 5 ft. 9 in. than there are of height 5 ft. 8 in. or 5 ft. 10 in. He shows that this is not due to the inclusion of men of different ages, since it occurs in 10 of the 13 age groups (5-year groups) taken separately. He also points out that it is not due to a predilection for even heights. The instance shows how difficult it is to obtain an "unselected sample" by merely securing large numbers without scientific control of the original observations.—L. J. Reed.

740. BRIDGES, CALVIN B. Gametic and observed ratios in *Drosophila*. Amer. Nat. 55: 51-61. 1921.—Lack of correspondence between gametic series and observed classes in genetic work with *Drosophila* depends largely on 3 factors: (1) The viability of the mutant type and character combination; (2) the suitability of the culture medium and other environmental conditions; (3) the competition due to over-crowding. The last can be met by concentrating on a few cultures in which food is provided in abundance. To meet (2), it has been found that a 1 per cent banana agar (equal amounts of banana and water) gives the most satisfactory culture medium for breeding large numbers of flies. For lessening or eliminating the effects of poor viability of certain mutant characters or character combinations, the most successful method found is that of making up "alternated stocks" such that the characters are divided as evenly as possible between the 2 parents of the cross. When the F_1 progeny are back-crossed to the multiple mutant stock, their offspring, from which the linkage ratios will be calculated, show a very small percentage of inviable combinations, and these tend to balance each other. Such methods are constantly making the genetic results in *Drosophila* more accurate.—H. H. Plough.

741. CLEGHORN, MAUDE L. First report on the inheritance of visible and invisible characters in silkworms. Proc. Zool. Soc. London 1918: 133-146. 1918.—Crossing multivoltine and univoltine races resulted in producing F_1 generations which differed from each other in that these generations were multivoltine or univoltine depending upon the character of the mother, that is, each of these generations followed the female parent. The results of numerous crossings of various kinds lead the author to conclude that the maternal parents are dominant in the univoltine and multivoltine character, respectively, and that these characters are inherited from the paternal grandparent in which they were dominant characters. Crossing races differing in cocoon size resulted in producing largest average size of cocoons in every 3rd generation. Crossings for cocoon (silk) color show that the inheritance of this character is clearly Mendelian.—Vernon Kellogg.

742. DETLEFSEN, J. A. Is crossing over a function of distance? Proc. Nation. Acad. Sci. [U. S.] 6: 663-670. 1920.—It is a current concept of recent genetics that genes may be given definite loci on chromosome maps, on the basis of the percentage of crossing over between them. It is believed that these maps roughly indicate the actual distances apart of the genes in the chromosome. Certain experiments involving selection of strains of *Drosophila* showing high and low crossing over between white and miniature in the sex chromosome throw doubt on the validity of this hypothesis. The stock originally showed about 33 per cent crossing over, but as a result of selection in a minus direction this percentage was reduced to 0 (no crossing over) in 10 generations in 1 line, and to 6 after 28 generations in another. These stocks when inbred continued to give this reduced percentage of crossing over. Selection for increased crossing over was ineffective. Crosses of a strain giving 6 per cent crossing over with the original stock gave F_1 females which showed a percentage about midway between the two. The evidence indicates that the percentage of crossing over in this case is a "variable which is determined by the different possible combinations of multiple modifying factors." The author concludes that "crossing over is not necessarily proportional to distance," that "distance between two genes may remain fairly constant, but the amount of crossing over depends on numerous hereditary factors."—H. H. Plough.

743. FEDERLEY, HARRY. Die Bedeutung der polymeren Faktoren für die Zeichnung der Lepidopteren. [The significance of polymeric factors for coloration in Lepidoptera.] Hereditas 1: 221-269. 9 fig. 1920.—The black aberration, *zatima*, of the arctiid moth, *Spilosoma*

lubricipeda, crossed with the yellowish-white type produces var. *intermedia*, which inbred gives a 1:2:1 ratio (1 *zatima*, 2 *intermedia*, 1 *lubricipeda*). A single factor, *Z* or *z*, differentiates them, promoting the development of black pigment much more vigorously in the homozygote than in the heterozygote. The great variability of *intermedia* and of *zatima*, and the rapid + or - effect of selection in a series of either variety, leads to the conclusion that a series of polymeric (modifying) factors influence *Z* in such wise that in *Zz* (*intermedia*) they act strongly, in *ZZ* (*zatima*) less strongly, and in *zz* (*lubricipeda*) negligibly; the number of these factors has not yet been determined. They control the distribution of the black pigment in different ways and hence are not homomeric. Evidences of action of polymeric factors were seen also in *S. menthastris*, *Cerula furcula*, and the *Leucodonta bicoloria-albida-unicolora* series.—Consideration of polymeric factors in moths leads to the conclusion that species are only apparently constant, consisting mainly of complex heterozygotes. Rare combinations of genes give "varieties"; the rarest, "aberrations." Homozygous combinations of polymeric factors, either dominant or recessive, producing the most extreme biotypes, occur in nature only with extreme rarity.—Critical examination of the supposed production of aberrations in *Arctia caja* by exposing pupae to cold shows that this genetically highly variable form is most unfavorable for such experiments, that the subsequent inheritance under normal temperatures by a few individuals of the aberrations supposed to be due to cold or heat is due to the combination in these individuals of polymeric intensity factors and is not "inheritance of acquired characters."—Selection for homozygous *zatima* soon reaches its limits; wing veins remain white. Hence the completely black aberration, *deschangei* Dupuiset, is probably due to a special gene, not the result of cumulative selection of polymeric factors.—*Zatima* was recorded in 1782, *intermedia* not till 1890–1899, and the author assumes that the earliest described *zatima*, unlike most melanics on first appearance, was homozygous [though dark *intermedia* individuals are as black as *zatima*]. Polymeric factors so alter the phenotype as literally to change white into black and lead to false conclusions regarding environmental versus hereditary control of development, especially in man and other mammals which afford relatively small numbers of individuals of the stock in question.—John H. Gerould.

744. FRETTS, G. P. [Dutch rev. of: BRYN, H. Trondelagens Antropologi. (Anthropology of Trondhjem.) K. Norske Videnskab. Selskab. 1917. IDEM. Researches into anthropological heredity. Hereditas 1: 186–212. 1920 (see Bot. Absts. 7, Entry 1732).] Genetica 3: 66–68. 1921.

745. HARRISON, J. W. HESLOP. The genus *Rosa*, its hybridology and other genetical problems. Trans. Nat. Hist. Soc. Northumberland, Durham, and Newcastle-upon-Tyne 5: 244–298. Pl. 8–22, 2 fig. 1921.—A study of a few closely related species of roses along with their allied forms from various sections of the country shows that the types merge imperceptibly into each other, thus forming a "linked-up series of groups," with each group separable from its neighbors by its own special characters. Further investigation shows that these chains of groups are of common occurrence. Each chain is definitely divided from the next. The writer considers each of these chains as being very close to a species in the Linnaean sense, though he believes that most taxonomists would accord them the rank of a section or subsection. The members of the chain are here considered as Jordanian species, or "microgenes," as the writer calls them. The chains are called "section-species." Eight of these section-species are recognized. Each species type is common to all section-species, seeming to indicate an orthogenetic trend of development in the evolution of the rose. Thus a table can be constructed, similar to MENDELEJEFF's Periodic Table, with the section-species as vertical groups and the species types as horizontal groups.—A careful study of the pollen of a number of roses reveals the fact that of 36 wild species and 2 garden hybrids produced from wild species, only 4 possess perfect pollen, while 75 per cent of them have less than half their pollen grains perfect, and about 40 per cent of them have less than 10 per cent of pollen capable of fertilizing ovules. Seven forms produced practically no good pollen. The conclusion is reached that pollen sterility is the outcome of latent hybridity. The pollen of *R. rugosa* and *R. cinnamomea*, 2 fairly well isolated species, seems to be largely perfect. In default of out-

side agencies, there is an automatic self-pollination of flowers in the rose at an early hour in the morning. While cross-pollination can occur, there is a surprising amount of selfing, much of it being accomplished by thrips. A number of cleistogamous flowers were found in *R. omissa*. Experiments have shown that practically all of the local rose microgenes depend upon self- or cross-pollination for the setting of seed and in the event of failure of these are, to some extent, facultatively apomictical. DINGLER has already demonstrated apomixis in a form of *R. rubiginosa*, and LUNDSTRÖM in *R. glauca* and *R. coriifolia*. The writer holds that such apogamy as is found in the rose has its origin in hybridity. Some polyembryony is reported and various natural hybrids of roses are described. [See also Bot. Absts. 9, Entry 738].—A. C. Fraser.

746. HERWERDEN, M. A. VAN. [Dutch rev. of: SEILER, J. Geschlechtschromosomen-Untersuchungen an Psychiden. I. Experimentelle Beeinflussung der geschlechtsbestimmenden Reifeteilung bei *Talaeporia tubulosa* Retz. (Sex chromosome investigations on psychids. I. Experimental influencing of sex-determining maturation division in *Talaeporia tubulosa* Retz.) Arch. Zellforsch. 15: 249-268. 1 pl. 1920 (see Bot. Absts. 7, Entry 1836).] Genetica 3: 79-81. 1921.

747. HÖPPLI. [German rev. of: CHRISTELLER, E. Untersuchungen an künstlich hervorbrachten Hermaphroditen bei Schmetterlingen. (Investigations on artificially produced hermaphrodites among Lepidoptera.) Schrift. Phys. Ökonom. Ges. Königsberg 59: 1918.] Centralbl. Allg. Path. 30: 512-514. 1920.

748. KING, HELEN DEAN. A comparative study of the birth mortality in the albino rat and in man. Anat. Rec. 20: 321-354. 1921.—The normal percentage of still births in rats for 31,670 births is 1.31. After correction, 2 per cent seems the high limit. For man numerous data ranging from 2 to 4 per cent to 5.67 per cent are given. The indications are that in higher mammals from 3 to 4 per cent of full-term fetuses are dead. The sex ratio of normal living rats is apparently 104.1 males to 100 females; this, however, is subject to corrections which makes 107 a more nearly correct estimate. In 415 still births (same material) the sex ratio was 129.3. The human sex ratio of living births shows a norm of about 105.5. The sex ratio of 13,635,986 still births (NICHOLS) is 131.6. The author estimates the primary sex ratio and criticizes MORGAN's hypothesis to explain the constant sex ratio in man. He also considers the evidence that the season influences the percentage of still births but concludes that such influence is negligible. In rat and man early postnatal mortality is about the same and is "somewhat higher" than the birth mortality. Causes and extent of birth mortality are given as follows: (a) Malposition of fetus and disease, about 1 per cent of human fetuses (MALL) but very rare in rats,—4 in 50,000. (b) Size of fetus, "important" in humans but not operative in rats. (c) Physical condition of mother, probably important in rats. (d) Age of mother: Very old rats and both very young and very old human mothers appear to give higher percentage of still births than those at zenith of reproductive period. (e) Congenital debility, over 50 per cent in humans and "practically all" cases in rats. The author discusses the control of percentage of still births and believes fetal nutrition to be an important factor; age of mothers is probably operative as a factor through this same medium of nutrition. Since the earlier the embryonic age, the greater the excess of male abortions that occur, "inadequate nutrition cannot be considered as the primary cause of the greater mortality among male fetuses in general." LILLIE's hypothesis of influence of sex hormones of mother on mortality of male fetuses is discussed. Inherent dissimilarity of sexes as regards constitutional vigor may have a basis in the amount of chromatin possessed by the ovum. The assumption is made that, from conception, the embryo that is to be a male has a constitution "inherently weaker" than the embryo that is to become a female; on this basis experimental facts may be explained.—C. C. Little.

749. KOLTONSKI, HERMANN. Über Erbllichkeit der Ovarial-, besonders der Dermoid-cysten. [On the inheritance of ovarian cysts, especially the dermoid cysts.] Zeitschr. Krebsforsch. 17: 408-416. 1920.—Five patients belonging to 2 families are considered. I. (a)

Female, 44 years old (father and 3 sisters out of 5 sibs have died of carcinoma of the digestive tract). Both ovaries were enlarged, cystic, left side having dermoid cyst with hair, pulp, teeth, and a dermoid villus.—(b) Female, 19, daughter of (a), had cyst on left side, behind uterus,—right ovary the size of a hen's egg, not adherent, with smooth, walnut-sized cyst on lateral half. The larger cyst, excised, showed, on sectioning, oily pulp with short black hairs, and a piece of bone developed from cartilage, with two teeth. The author discusses the probability of inheritance.—II. (a) Female, 41 years old. From the rear end of the uterus a subserous myoma, the size of a goose egg, occurred.—(b) The 15-year-old daughter of II (a). An operation revealed a dermoid cyst on the right side as large as a man's head, and, over it, the thickened tube. Most of the tumor was cystic with serous contents; only in one place was dermoid pulp and a villus present.—(c) The sister of II (b) had a parovarial cystic tumor (the size of a child's head), which was excised with the tube.—The author considers the theories of the origin of the 3 types of tumors here considered. He believes that they may support BILLROTH's hypothesis of a general cancer diathesis. This theory and the possible factors underlying tumor formation are discussed. The author believes that there is an hereditary disposition to tumor formation which is general in nature,—the type of tumor in the special case being due solely to chance.—C. C. Little.

750. LEK, VAN DER. [Dutch rev. of: NILSSON-EHLE, H. Über Resistenz gegen Heterodera Schachtli bei gewissen Gerstensorten, ihre Vererbungsweise und Bedeutung für die Praxis. (On the resistance to Heterodera Schachtli in certain varieties of barley, its method of inheritance, and significance for agricultural practice.) Hereditas 1: 1-34. 4 fig. 1920 (see Bot. Absts. 6, Entry 1731).] Genetica 3: 71-72. 1921.

751. LOEB, JACQUES. Further observations on the production of parthenogenetic frogs. Jour. Gen. Physiol. 3: 539-545. 3 fig. 1921.—Over 20 parthenogenetic frogs, produced by puncturing unfertilized eggs, have been raised to advanced and adult stages. The occurrence of both sexes suggests that, in the frog, the female is heterozygous for sex. The males possess 26 chromosomes, the diploid number. Accidental fertilization of eggs was excluded by mode of procedure and only the punctured eggs developed. The diploid number may have been produced either by retention of the second polar body or premature division of chromosomes without cell division. The number of chromosomes in female parthenogenetic frogs is unknown but both diploid and haploid numbers have been reported from tadpoles too young for sex determination. Many parthenogenetic tadpoles did not metamorphose although growth was normal. One over a year old was made to metamorphose in 2 weeks by feeding thyroid gland from cattle.—J. L. Collins.

752. LOTSY, J. P. [Dutch rev. of: SAKAMURA, T. Experimentelle Studien über die Zell- und Kernteilung mit besonderer Rücksicht auf Form, Grösse und Zahl der Chromosomen. (Experimental studies on cell division and nuclear division with special reference to form, size, and number of the chromosomes.) Jour. Coll. Sci. Imp. Univ. Tôkyô 39^{II}: 1-221. 7 pl., 24 fig. 1920 (see Bot. Absts. 7, Entry 1844; 8, Entry 330).] Genetica 3: 72-77. 1921.

753. MALINOWSKI, EDMUND. Die Sterilität der Bastarde im Lichte des Mendelismus. [The sterility of hybrids in the light of Mendelism.] Zeitschr. Indukt. Abstamm.- u. Vererb. 22: 225-235. 1920.—The author made crosses between different types of *Triticum vulgare* and *T. dicoccum* and determined the degree of fertility of the offspring by dividing the number of seeds by the number of spikelets in the head. F_1 was morphologically intermediate between the parents. In F_2 , new forms appeared, whose characters were inheritable. F_2 showed more partly or wholly sterile plants than fertile, and the greatest number of individuals with relatively high degree of sterility. The results show very little evidence of interdependence between morphology and sterility. A study of F_3 shows that different degrees of partial sterility are inheritable.—The author criticises BELLING's theory that sterility in hybrids is due to the genetic composition of individual spores or gametes and proposes instead the theory of genes or inharmonious elements meeting in a hybrid which act as complements to produce

partial impotence of the plant as a whole. The impotence of individual spores and gametes is hence considered to be independent of their own composition. The grade of impotence is assumed to be determined for the zygote as an individual, and the association of a lesser or greater number of pairs of complementary genes decreases or increases the impotence.—*Hester M. Rusk.*

754. MALINOWSKI, EDMUND. *Studia nad Mieszcancami Pszenicy*. [Studies on wheat hybrids.] *Prace Towarzystwa Naukowego Warszawskiego* 30. 220 p., 10 pl., 33 fig. 1918. [Polish, with French translation.]—A study of crosses of lax, squarehead, and compact types of *Triticum vulgare*, with lax, square, and semicompact types of *T. dicoccum*. Seventeen crosses are described as to their behavior in F_1 and F_2 . Ninety-six selected F_2 progenies are described in the F_3 . Aside from the parental types, other forms appeared in the F_2 ,—*Triticum spelta*, *T. turgidum*, *T. durum*, some very similar to *T. polonicum*, and 2 new forms, *T. ellipsicum* and *T. lanceolatum*. All these forms are distinguishable by the shape and size of their glumes and spikelets. The author attributes the size and shape of the glumes and spikelets to the presence or absence of cumulative factors. Size and shape of grain are related to the size and shape of the glume. Partial or complete sterility is explained on the basis of Mendelism through 2 or more discordant factors meeting in the same individual. The degree of sterility depends on the number as well as the quality of these factors. Three types of inheritance are obtained as regards length of head, giving ratios of 1 : 2 : 1, 3 : 1, and 15 : 1. These are found by intercrossing to be related and the factors concerned are complementary.—*R. Summerby.*

755. MARIE-VICTORIN, FR. *La vie sexuelle chez les Hydrocharitacées*. [The sexual life of the Hydrocharitaceae.] *Nat. Canadien* 45: 130-133. 1919.—The method of pollination in *Vallisneria* is discussed, comparing the statements of MIGNAULT [see Bot. Absts. 3, Entry 1112] with the generally accepted ideas. The author describes the liberation and opening of the staminate flowers of *Philonotria canadensis* (Michx.) Britton (*Eloдея canadensis* Michx.) and the opening and pollination of the pistillate flowers, his observations agreeing essentially with those of WYLIE (The morphology of *Eloдея canadensis*. Bot. Gaz. 37: 1-22. 1904). [See also Bot. Absts. 3, Entry 1111.]—*C. E. Allen.*

756. MORGAN, T. H. *Variation in juvenile fiddler crabs*. *Amer. Nat.* 55: 82-83. 1921.—The author replies to Miss RATHBUN's criticism [see Bot. Absts. 9, Entry 759] of his former paper (*Amer. Nat.* 54: 220-240). He states that these "small crabs with narrow abdomen were stated in my paper to show either a change toward maleness or possibly a retention of the juvenile condition," that out of more than 3000 individuals that were collected only a few showed the narrow abdomen, and that with considerable reservations he had ventured to call these intersexes because the variation in question was in the direction of a character peculiar to the opposite sex.—*A. M. Banta.*

757. NORTHROP, JOHN H. *Concerning the hereditary adaptation of organisms to higher temperature*. *Studies Rockefeller Inst. Med. Res.* 36: 259-264. 1921.—Reprinted from *Jour. Gen. Physiol.* 2: 313-318. 1920 [see Bot. Absts. 5, Entry 433].—*Geo. H. Shull.*

758. P[OPENOE], P[AUL]. [Rev. of: GRUENBERG, BENJAMIN C. *Elementary biology*. x + 528 p., 26 fig. Ginn & Co.: Boston, 1919 (see Bot. Absts. 3, Entry 1902).] *Jour. Heredity* 12: 41. 1921.

759. RATHBUN, MARY J. *On intersexes in fiddler crabs*. *Amer. Nat.* 55: 80-82. 1921.—The author criticizes MORGAN's interpretation of exceptional fiddler crabs as intersexes rather than juvenile states, asserting that he has "... thereby seemingly robbed the female fiddler of its period of adolescence." [See also Bot. Absts. 9, Entry 756.]—*A. M. Banta.*

760. SCHWEISSEIMER, W. Bevölkerungsbiologische Bilanz des Krieges 1914-19. [Population effects of the war 1914-1919.] Arch. Rass.- u. Gesellschaftsbiol. 13: 176-193. 1920.—This paper reports studies of the effect of the world war on population, considering losses both from deaths and from decrease of births. Tables are given to show the losses under these heads for all of the important countries of Europe. The last part of the paper is devoted to a discussion of the ratio of males to females, showing the decrease in the ratio between 1913 and 1919.—*L. J. Reed.*

761. SIRKS, M. J. [Dutch rev. of: SCHMIDT, JOHS. Racial investigations. IV. The genetic behavior of a secondary sexual character. Compt. Rend. Trav. Carlsberg Lab. 14⁵: 1-12. Pl. 1-5 (colored). 1920.] Genetica 3: 77-79. 1921.

762. SKUPIENSKI, F.-X. Sur la sexualité chez une espèce de Myxomycète Acrasiée, Dictyostelium mucoroides. [Sexuality of a species of Acrasiales, Dictyostelium mucoroides.] Compt. Rend. Acad. Sci. Paris 167: 960-962. 1918.—The germination of the spore (in culture) is followed immediately by a motile amoeboid stage. There is no ciliated phase. The myxamoebae multiply, the nuclear division being karyokinetic, the chromosome number 4. After a series of divisions, the uninucleate myxamoebae, now relatively large and vacuolate, become arranged in pairs and fuse. Fusion of the cytoplasm is followed by that of the nuclei. The zygotes become massed together and sporulation follows.—*C. E. Allen.*

763. SLOCUM, R. R. Methods of pedigree breeding at the government poultry farm. Amer. Poultry Advocate 28: 435-437. 8 fig. 1920.—A brief popular article that contains nothing new.—*H. D. Goodale.*

764. SMITH, W. G. Special strains of medicinal plants by selection. Pharm. Jour. 104: 116-117. 1920.—The present paper is a summary of a semi-popular lecture on breeding medicinal plants. Principles and methods used in agricultural plant breeding are summarized as follows: (a) Standard species, as of *Digitalis* and *Belladonna*, are composed of many varieties which show great diversity when studied intensively; (b) internal qualities are rarely changed by cultivation, fertilization, etc.; (c) improvement within species is obtained by selecting and propagating the best individuals; (d) better results have been obtained by selection of single plants giving rise to pure lines, as for instance in the sugar beet; (e) production of new combinations by hybridization may lead to improvement in any required direction.—To illustrate these principles and methods the author mentions marked improvement and rise in price of French lavender. Strains such as *Lavendula vera fragrans* and *L. vera delphiniensis* produce the finest oil and thrive at both low and high altitudes. *L. spica*, a native of lower altitudes, yields very inferior oil, as does the hybrid, *L. vera* × *L. spica*. The superiority of English lavender is probably due to long and intensive observation and selection. The standard of yield has been greatly increased where selection of races has been practiced. An effort began in 1904 to improve Hungarian oil of peppermint, resulting in a yield of 62-71 per cent of laevocaryone in Hungarian oil of *Mentha crispa*, as compared with 35-56 per cent in American, 35-56 per cent in German, and 5-10 per cent in Russian. Hungarian oil of *M. piperita* yields 43-56 per cent free menthol and 35-65 per cent total menthol, as compared with American oil, *M. piperita* yielding 40-45 per cent free menthol and 60 per cent total menthol. *M. piperita* has been shown by CAMUS to be a hybrid between *M. viridis* and *M. aquatica*, which thus explains its wide range of variation. The variety "Red mint," cultivated in France and coming more into use, has been found to grow where true peppermint cannot grow, and in the same field for 4 or 5 years, while true peppermint can be grown but 2 years on the same ground. "Red mint" gives a high yield but the oil is of inferior quality. Possibility in improvement is indicated by the great variation in *M. piperita*.—In America, by selection, belladonna, normally yielding 0.23 per cent alkaloid, has been made to yield 0.55 per cent; strains yielding 0.43 per cent have been made to yield 0.72 per cent; and those yielding 0.62 per cent have been selected to yield 0.87 per cent. By selection, strains of *Datura* normally yielding 0.34 and 0.35 per cent of alkaloid have been improved to yield 0.53 and 0.56 per cent respectively. [See also Bot. Absts. 6, Entry 825.]—*Francena R. Meyer.*

765. SOLER, RAPHAEL ANGEL. Cultivo del tomate. [Tomato culture.] Rev. Agric. Com. y Trab. [Cuba] 2: 479-483. 4 fig. 1919.—Progress is recorded in selection, 1917-1919, from semi-wild plants, the original stock of which is supposed to have come from the Canary Islands, 1849 or 1850. There were 3 types of tomato,—plum, pear, and ribbed. From the ribbed of the 3rd crop the author selected several strains differing in smoothness of skin and size. The selection was carried out for good salad size and for condiment. A table gives data of the 3rd crop for number of fruits and total weight in the following classes: Large salad size, commercial or cooking, large pear, small pear, plum.—*E. E. Barker.*

766. TISCHLER, G. [German rev. of: HERTWIG, G., UND P. HERTWIG. Triploide Froschlärven. (Triploid frog larvae.) Arch. Mikrosk. Anat. 94: 34-54. 1920.] Zeitschr. Bot. 13: 321-322. 1921.

767. TISCHLER, G. [German rev. of: ROSENBERG, O. Weitere Untersuchungen über die Chromosomenverhältnisse in Crepis. (Further remarks on the chromosome relations in Crepis.) Svensk Bot. Tidskr. 14: 319-325. 5 fig. 1920 (see Bot. Absts. 7, Entry 236).] Zeitschr. Bot. 13: 320-321. 1921.

768. TISCHLER, G. [German rev. of: WINKLER, HANS. Verbreitung und Ursache der Parthenogenese im Pflanzen- und Tierreiche. (Distribution and cause of parthenogenesis in the plant and animal kingdoms.) 8 vo, vi + 231 p. Gustav Fischer: Jena, 1920.] Zeitschr. Bot. 13: 317-320. 1921.

769. TRELEASE, W. The survival of the unlike. Science 51: 599-605. 1920.—The species and groups of species of agaves of the different islands of the West Indies differ from one another somewhat in proportion to the depth of water between their habitats. In any 2 adjacent islands the species differ sometimes in one character and sometimes in another, though no climatic difference is evident. It is not obvious that these differences are, or were, of survival value.—*John Belling.*

770. TSCHERMAK, E. VON. Beobachtungen bei Bastardierung zwischen Kulturhafer und Wildhafer. [Observations on hybridization between cultivated oats and wild oats.] Zeitschr. Pflanzenzücht. 6: 207-209. 1918.—In hybrids between wild oats and cultivated oats it has been determined that there is absolute coupling between the wild-oat characters, (M_1) falling apart of the spikelets on ripening, that is, brittleness with breaking apart at the horse-shoe-shaped callus, and (M_2) complete beardedness. On the other hand, there is complete incompatibility of the wild-oat character, (M_3) strong hairiness of the lemmas of all flowers, and (m_4) the cultivated-oat character, yellow glume color; and also (in the observations of the author) of the wild-oat character, (M_4) brown glume color, and (m_3) the cultivated-oat character, glabrousness. Schematically represented:-

$$F_1 = M_1 < m_1; M_2 \leq m_2; M_3 \leq m_3; M_4 > m_4$$

$$F_2 = (1) (M_1 M_2) (M_3 M_4)$$

$$(2) (M_1 M_2) (m_3 m_4)$$

$$(3) \text{ as } F_1$$

$$(4) (m_1 m_2) (m_3 m_4)$$

The following combination is lacking:

$$(m_1 m_2) (M_3 M_4)$$

These combinations are barred out:

$$(M_1 M_2) (m_3 M_4), \text{ and } (M_1 M_2) (M_3 m_4)$$

There is repulsion between groups ($m_1 m_2$) and ($M_3 M_4$), that is, a coupling of groups ($M_3 M_4$) and ($M_1 M_2$), but not vice versa. Limiting "wild-form" (wf) to the coupled character pair brittle-fully-bearded and "cultivated-form" (cf) to non-brittle-weakly-bearded, then the method of inheritance is as follows, agreeing with the barley-glume type:

P_1 cf \times wf; F_1 intermediate (in general the non-brittleness of cf dominant)

F_2	wf 4	Intermediate I 9	cf 3
F_3	Constant	4 segregate, wf : I : cf = 4 : 9 : 3 2 segregate, I : wf = 3 : 1 2 segregate, I : cf = 3 : 1 1 constant	2 segregate, cf : wf = 3 : 1 1 constant

This is explained on a bi-factorial basis on presence and absence theory as "wild-form" ($ABAB$) and "cultivated-form" ($abab$), or on association-dissociation difference in relation to 3 mutually present factors, where "wild-form" is A^+B^+C and "cultivated-form" is $A\downarrow B\downarrow C$.—C. E. Leighty.

771. VOGTHERR, KARL. Über die theoretischen Grundlagen des Variabilitäts- und Deszendenzproblems. [On the theoretical fundamentals of the problems of variation and descent.] Zeitschr. Indukt. Abstamm.- u. Vererb. 19: 39-72. 1918.—In his introduction the author claims that whereas empirically great progress has been made with experiments in which species of animals have been modified into others by changing external conditions, the theory is still backward, and the strife between the Lamarckians and Darwinists is continued with the old blunted weapons. He is greatly impressed by TOWER's classical experiments on the production of new species of potato beetles by experimental conditions and by KAMMERER's work on *Alytes*, which he thinks prove the possibility of evolution in organisms. Both in inorganic objects and in organisms atypical and typical forms can be distinguished. Typically formed natural objects do not follow external influences but internal laws. There are no completely typical natural objects. The real task of the naturalist is to find the typical among what happens.—Variation can be caused by changes in external conditions or can be also combined with a change in the internal plant. The author calls these 2 kinds of variation homotypical and heterotypical.—The causes for all variations are changes in the environment. The lines according to which the phylogenetic development will proceed are potentially determined and unchangeable.—According to Vogtherr it is illogical to demand that the changed character shall continue after the conditions which caused them have changed back to the original ones. Putting the organisms back into normal conditions is a second experiment on heredity, and a change of the characters back to normal constitutes a second, additional proof, not a refutation. There is no reason to expect that heterotypical variation will be irreversible. The author introduces a "vital force" (Lebenskraft). This vital force reacts upon external conditions. That part of the paper in which the author defines his standpoint as not being quite that of either DRIESCH, KANT, or SCHOPENHAUER should be read in the original.—The cause of physical things can never be psychical. It is fundamentally impossible to find a scientific explanation of the harmony which we observe in organisms, because the organizing principles are the forces of the organic nature. This harmony is not historically developed, but it has always existed and will exist eternally.—A. L. Hagedoorn.

772. WAARDENBURG, P. J. [Dutch rev. of: BEHR. Die Heredodegeneration der Makula. (Heredodegeneration of the macula.) Klin. Monatsbl. Augenheilk. 65: 465. 1920.] Genetica 3: 88-91. 1921.

773. WAARDENBURG, P. J. [Dutch rev. of: BRIGGS, H. H. Hereditary congenital ptosis with report of 64 cases conforming to the Mendelian rule of dominance. Amer. Jour. Ophthalmol. 1919: 408. 1919.] Genetica 3: 65-66. 1921.

774. WAARDENBURG, P. J. [Dutch rev. of: FLEISCHER, BRUNO. Über myotonische Dystrophie mit Katarakt. (Myotonic dystrophia and cataract.) Arch. Ophthalmol. 96: 91-133. 1918.] Genetica 3: 91-96. 1921.

775. WAARDENBURG, P. J. [Dutch rev. of: TRAQUAIR, H. M. Hereditary glioma of the retina. British Jour. Ophthalmol. Jan., 1919.] Genetica 3: 81. 1921.

776. WESTERBEEK VAN EERTEN, J. B. [Dutch rev. of: WESTERBEEK VAN EERTEN, J. B. *arte te Hummelo. Eugenetiek, historisch-critisch overzicht. (Eugenics, a historical critical review.)* 207 p. A. A. von Deutekom: Utrecht, 1920.] *Genetica* 3: 81-88. 1921.

777. WETTSTEIN, F. VON. Künstliche haploide Parthenogenese bei *Vaucheria* und die geschlechtliche Tendenz ihrer Keimzellen. [Artificial haploid parthenogenesis in *Vaucheria* and the sexual tendency of its germ cells.] *Ber. Deutsch. Bot. Ges.* 38: 260-266. *Fig. 1-2.* 1920.—Antheridia were removed at a very early stage of development; later, when the oogonium had reached its full size and was cut off by a partition wall, but before opening, it was pricked with a fine needle or with a thin, sharp glass capillary tube. To prevent the oozing out of the cell contents, each operation was performed in a plasmolyzing solution (3 per cent KNO_3); after about 2 minutes the plant was returned to the normal nutrient solution. Of numerous oogonia of *Vaucheria hamata* (Vauch.) DC. thus treated, 3 grew out into filaments; 1 of these filaments died while still short; the other 2 were separated from the parent plant, and each developed into a plant of typical form which, like the mother plant, bore both antheridia and oogonia.—Of a considerable number of antheridia similarly wounded, 2 developed into filaments, 1 of which survived to become likewise a typical monoecious plant.—Of *V. sessilis* (Vauch.) DC., 1 oogonium was induced to regenerate, with similar results.—These experiments are considered as supporting the notion of CORRENS that both sexual potentialities are present in the cells of both monoecious and dioecious plants, whether haploid or diploid, and that the development of either sex organ results from the action of factors which inhibit the expression of the opposite potentiality, either in the plant as a whole (dioecism) or in a particular part of the plant (monoecism). In the present case, the regenerating organs contained only the sexual nuclei, which in each case, therefore, must carry both sexual potentialities.—C. E. Allen.

778. WITSCHI. [German rev. of: LEBEDINSKY, N. G. *Darwins geschlechtliche Zuchtwahl und ihre arterhaltende Bedeutung. (Darwin's sexual selection and its significance for the maintenance of species.)* Habilitationsvortrag Univ. Basel. 31 p. Helbing Lichtenhahn: Basel, 1918. IDEM. *Geschlechtsdimorphismus und Sexualsektion. (Sex dimorphism and sexual selection.)* *Verh. Naturf. Ges. Basel* 30: 1919.] *Biol. Zentralbl.* 40: 571-573. 1920.

HORTICULTURE

J. H. GOURLEY, *Editor*

H. E. KNOWLTON, *Assistant Editor*

(See also in this issue Entries 590, 604, 606, 625, 662, 666, 667, 729, 898, 910, 932, 948 954, 960, 1020, 1038, 1070, 1093, 1094)

FRUITS AND GENERAL HORTICULTURE

779. ANONYMOUS. Culturas intercalares entre os coqueiros. [Crops for interplanting between coconuts.] *Bol. Agric. [Nova Goa, Portuguese East India]* 1: 210-212. 1919.—Minor crops are listed which can be cultivated between the rows in coconut plantations, including those that may be grown during the first 5 years before the coconuts are in bearing and those that may be grown after that time. Sweet potatoes, coffee, millet, bananas, cassava, tomatoes, peppers, eggplants, and other vegetables are recommended. Various leguminous cover crops will also prove beneficial.—John A. Stevenson.

780. ANONYMOUS. Posição do côco-semente no solo. [Position of the seed coconut in the ground.] *Bol. Agric. [Nova Goa, Portuguese East India]* 1: 212-214. 1919.—An experiment was carried out to ascertain the proper position for planting coconuts. One lot was placed vertically with the germ end up, a 2nd lot in the reverse position, a 3rd lot horizontal with the germ end slightly depressed, a 4th lot horizontal, and a 5th lot the reverse of the 3rd. It was found that coconuts in the 3rd and 4th positions germinated best.—John A. Stevenson.

781. ANONYMOUS. Sobre a floração da mangueiro. [The blooming of the mango.] Bol. Agric. [Nova Goa, Portuguese East India] 1: 207-210. 1919.—The causes of non-flowering in the mango (*Mangifera indica*) are discussed, including excessive heat and humidity, insects, and overproduction the previous year. Remedies for certain of these conditions are outlined.—*John A. Stevenson.*

782. ANONYMOUS. Two new raspberries. Jour. Pomol. 1: 243. 2 pl. 1920.—Two promising new varieties of red raspberry are described, the Pyne's Royal and the Park Lane, both originated by Mr. Pyne of Topsham, Devon, and introduced in 1912 and 1913.—*L. H. MacDaniels.*

783. ALLEN, W. J. Fruit trees that have been blown over. Agric. Gaz. New South Wales 32: 292. 1921.—The article discusses the handling of such trees.—*L. R. Waldron.*

784. ANTHONY, R. D. Has the orchard survey a place on the research program? Proc. Amer. Soc. Hort. Sci. 17: 174-178. 1920 [1921].—This paper discusses the manner in which a pomological survey, dealing chiefly with apples, was conducted in Pennsylvania. The author concludes that, inasmuch as the survey brought the College and Station staff into close contact with actual field conditions in the state, the staff was thereby in a much better position to plan and conduct its research work so as to be of the greatest value to the state. This would not have been possible without the intimate knowledge of the problems which were brought out by the survey.—*H. W. Richey.*

785. AUCHTER, E. C. A preliminary report on apple and pear breeding in Maryland. Proc. Amer. Soc. Hort. Sci. 17: 19-32. 1920 [1921].—This is a preliminary report covering the investigations in apple and pear breeding during the past 15 years. The pear crosses are mainly between Keiffer and other standard varieties. In most of the apple crosses one or both parents were from early varieties. Since many of the pear and apple seedlings have not fruited, a detailed study has been made only of the results secured from the 1907 early-apple crosses. The varieties intercrossed have been chiefly Early Ripe, Yellow Transparent, Williams, Red June, Astrachan, and Early Harvest. Seeds have also been secured from these varieties when open pollinated. The results show that certain crosses set fruit better than others; that more seeds per apple were produced from some crosses; that the percentage of germination varied considerably, and that in certain crosses a greater percentage of seedlings died, whether from poor environmental conditions or weak constitutional vigor. There is a suggestion that the factor, or factors, for long length of apples is dominant over the factor, or factors, for shorter length, those for red color over those for yellow color, and those for acid or sub-acid flavor over those for mild sub-acid or sweet flavor. The fruit of seedlings has about the same ripening period as that of their parents. Of the 166 crossed seedlings, 24 appear to be promising, of the 90 seedlings produced from open pollinated fruit, only 2 are promising. Williams seems to be a good variety for early-apple breeding. Of the cross, Williams \times Transparent, one seedling, ripening as early as the earliest Transparents, is very promising.—*E. C. Auchter.*

786. BALME, JUAN. El kaki. [The kaki] Rev. Agric. [Mexico] 5: 505-507. 3 fig. 1920.—The possibilities of the culture of the kaki, or Japanese persimmon, in Mexico are discussed. Several varieties are described.—*John A. Stevenson.*

787. BALME, JUAN. El porvenir de las frutas tropicales. El coco y el dátil. [The future of tropical fruits. The coconut and the date.] Rev. Agric. [Mexico] 5: 579-581. 3 fig. 1920.—The possibilities of growing the date and coconut commercially in Mexico are discussed.—*John A. Stevenson.*

788. BALME, JUAN. La viticulture en Mexico. [Viticulture in Mexico.] Rev. Agric. [Mexico] 5: 581-583. 2 fig. 1920.—In order to encourage the grape growing industry in Mexico, the Department of Agriculture has decided to distribute a million plants of selected varieties. For comparative purposes, statistics of the California industry are given.—*John A. Stevenson.*

789. BARKER, B. T. P., AND G. T. SPINKS. Fruit breeding investigations at Long Ashton. Jour. Pomol. 1: 224-234. 1920.—A large number of crosses were made between different varieties of apples, pears, plums, cherries, currants, gooseberries, and strawberries. The purpose of the work was to produce varieties with definite combinations of characters by using known parents, and to ascertain to what extent the offspring would resemble the different parents. Most of the tree-fruit seedlings have not yet come into bearing, so no conclusions can be drawn.—Seedlings from the seeds of the same apple in a given cross resemble each other in fruit characters more closely than those from different fruits of the same cross.—The results of raspberry breeding are unsatisfactory because nearly all the hybrids produce very few blossoms.—*L. H. MacDaniels.*

790. BARNETT, R. J. Terminology of orchard soil management methods. Proc. Amer. Soc. Hort. Sci. 17: 172-174. 1920 [1921].—The stated purpose of the article is the discussion of definitely fixing the terminology and orthography of pomological literature. For illustration, a list of terms descriptive of various orchard soil management methods with their orthography and definitions is submitted.—*H. W. Richey.*

791. BARSS, H. P. Success in spraying. Better Fruit 15³: 3-4. 1921.—Though spraying has reached its highest development in the Pacific Northwest, there are certain pertinent facts that the grower must keep in mind in order to be successful: (1) Spraying is not a cure but a prevention; (2) timeliness of application is essential; (3) the work must be thorough (iron sulphate [copperas] may be used as an indicator); (4) a particular spray must be used for a particular disease or pest; (5) spraying is cumulative in effect; (6) economy of spraying is measured not by the amount of spray saved but by the degree of prevention secured.—*A. E. Murneek.*

792. BEACH, S. A. Fruit breeding in the Northwest and its significance in horticultural development. Proc. Amer. Soc. Hort. Sci. 17: 13-19. 1920 [1921].—The author discusses fruit breeding in the upper Mississippi Valley and Great Plains regions where most of the standard fruits have failed because of inability to withstand the climatic extremes. In the more favored areas, a few standard varieties of apples and some cherries are grown, but practically no standard varieties of plums, sweet cherries, peaches, quinces, pears, and other orchard fruits.—The obstacles to success in fruit breeding are many, one of the most important being the lack of hardiness of the most desirable types. Barring the crab apple, the Hibernial and others of its type appear to be superior in hardiness. One problem is to determine to what extent hardiness in the apple and crab apple can be segregated and recombined with other desirable characters, and what varieties can best be depended upon as parents to transmit these characters. Late-keeping winter apples must be developed for the region. There are several good summer and early autumn varieties which are either crab hybrids or of the Russian group. It is thought that in time many hardy varieties will be developed for this region, and that there is a great future for both amateur and commercial fruit growing in the section.—*E. C. Auchter.*

793. BEEKHUIS, H. A. Handling the peach crop. Associated Grower 1⁵: 7, 42. 1920.—Well matured, uninjured, and properly treated peaches yield the best dried product.—*E. L. Overholser.*

794. BONCQUET, P. A. The dieback of Emperor grapes. Associated Grower 17: 9, 42, 43, 48. 1920.—Occasionally vines remain dormant, not growing in the spring. If they do develop, their growth remains incomplete and the leaves undersized. This behavior is attributed to lack of carbohydrate supply.—*E. L. Overholser.*

795. BONNET, L. O. The Dizmar grape. Associated Grower 1⁸: 24-25, 42. 1920.—The berry is large, almost ellipsoidal in shape, has neutral flavor, thin skin, and crisp texture. The bunch is large, ovoid elongated, and loose, and the vine is vigorous with long spreading canes. It is a good shipping grape, grows well on soils adapted to the Muscat, and will bear profitable crops if pruned long.—*E. L. Overholser.*

796. BRADY, J. Protecting orchards from frost with smudge-pots. *Agric. Gaz. New South Wales* 32: 256. 1921.—The article briefly describes the method used in California.—*L. R. Waldron.*

797. BROWN, G. G. Fertilizer for orchard and bush fruits. *Better Fruit* 15³: 8, 23-25. 1921.—The writer recommends the following fertilizing program based on observations and experiments performed at the Hood River Branch Experiment Station: No fertilizer should be used for young trees if the ground is clean cultivated and new growth is ample; otherwise $\frac{3}{4}$ -1 lb. of nitrate of soda per tree. When trees are commencing to bear, but show poor vegetative growth, 2 pounds of nitrate per tree may be advisable. In old orchards nitrate of soda may be of great value, excepting where alfalfa or clover is grown and plowed in; the latter will furnish enough nitrogen to supply the needs of the tree. When alfalfa has "run out," clean cultivation may be practiced for 1 or 2 years followed by new seeding of alfalfa. A small amount of nitrate of soda may be added to advantage during the 1st year after seeding to alfalfa or clover.—For strawberries the writer recommends a complete fertilizer made up as follows: Nitrate of soda 800 lbs., superphosphate 800 lbs., beet char 400 lbs.—*A. E. Murneek.*

798. BROWN, W. S. The December freeze—some lessons from it. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 9-14. *Fig.* 1-4. 1921.—This article consists of notes indicating the relative behavior and resistance of varieties of fruit trees to winter freezes, some methods of treatment of winter-injured trees, and cultural advice on possible means of preventing such injury.—*E. J. Kraus.*

799. BUNYARD, EDWARD A. The history of paradise stocks. *Jour. Pomol.* 1: 166-176. 1920.—This is an endeavor to straighten out the confused botanical relationships of the different types of paradise stocks. The history of the various types is traced from the time of Theophrastus.—*L. H. MacDaniels.*

800. CHOMLEY, F. G., AND J. ARTHUR. Some experiences with fruit under irrigation. *Agric. Gaz. New South Wales* 32: 273-276. 1921.—Methods of irrigation and culture are given; also notes on varieties, and spraying to combat disease.—*L. R. Waldron.*

801. COIT, J. E. Mechanical theory of splitting figs. *Associated Grower* 1⁸: 30-31. 1920.—Transpiration is suddenly stopped by a drop in temperature and the roots continue to supply water to the figs, bursting them. If this hypothesis is correct the best general prevention would be the application of uniform moisture. Fermentation is caused by infection with yeasts. If the fig is well sugared, yeast will do no harm. Fermentation by yeasts invites other destructive fungi, such as blue molds, black smut, and dry rot.—*E. L. Overholser.*

802. CONDIT, I. J. California fig soil and fertilizers. *Associated Grower* 1¹: 18-19. 1920.—Although very resistant to alkali, it is inadvisable to plant figs on soil containing more than 0.03 per cent total salt. A high water table acts detrimentally on the fig crop, reduces leaf surface, and retards the normal activities of the tree.—*E. L. Overholser.*

803. CONDIT, I. J. Getting the people acquainted with the great American fig. *Associated Grower* 1⁸: 18, 35. 1920.—The Kadota fig tree is resistant to unfavorable moisture conditions, and a rank grower when given an abundant water supply. The 1st crop consists of much larger sized fruit than the 2nd, the latter, however, being much better for preserving and canning purposes. Caprification affects the fruit of the Kadota more noticeably than it does most other common figs. The value of caprification depends upon ultimate use to which the fruit is to be put; thus, caprifigged figs though better for drying are not so desirable for canning. Being very adaptable to soil and climate conditions, the Kadota is propagated over a wide range of territory.—*E. L. Overholser.*

804. CONDIT, I. J. Points on practical culture of figs. *Associated Grower* 1²: 9, 46. 1920.—Caprification is now recognized as a necessity in the production of Smyrna figs. Three capri fig trees must be planted for every 100 Calimyrna trees. The female *Blastophaga* can

enter when the figs are less than $\frac{3}{8}$ inch in diameter; the flowers of such figs are presumably receptive to pollen. From that stage until the figs reach about 1 inch in diameter they may be entered by insects and caprifiged. Capri figs are ready to pick as soon as the male insects issue freely from the gall flowers. The most popular varieties of caprifigs are Stanford and Roeding No. 3.—*E. L. Overholser*.

805. CONDIT, I. J. Summer pruning of the fig. *Associated Grower* 14: 28-30. 1920.—Certain varieties, like the Mission and Adriatic, respond profitably to early summer pruning. Summer pruning not only favors a desirable crop but also accentuates the growth of the main framework of the tree; thus the amount of succulent growth is greatly reduced and better protection is afforded against winter frosts.—*E. L. Overholser*.

806. CRADWICK, W. Cocoa. *Jour. Jamaica Agric. Soc.* 25: 52-57. 1921.—The author presents a discussion of cacao growing under Jamaican conditions, including cultural directions, shading, pruning, and the proper time for picking.—*John A. Stevenson*.

807. CRANDALL, C. S. An experience in self-fertilization of the peach. *Proc. Amer. Soc. Hort. Sci.* 17: 33-37. 1920 [1921].—Investigations were made concerning the self-fertility of seedling peach trees of known parentage, some of which were grown in the orchard and others in the greenhouse under more or less controlled conditions. Some buds were emasculated and hand pollinated while others were covered without emasculation or hand pollination. By the former method, as practiced in the orchard, 6.38 flowers were required to produce one seedling tree; by the latter, 20.5 to produce one seedling tree growing in the orchard. This reduced number was due to lack of fertilization, undeveloped embryos, and poor germination of seed. The work done under glass was less successful from the standpoint of surviving seedlings since each required the pollination of 7.24 flowers. It is probable that this difference is due to deficient nutrition of the trees grown in tubs.—*E. C. Auchter*.

808. CRANE, M. B. The raising of fruit trees from seed. *Jour. Pomol.* 1: 210-216. 2 fig. 1920.—An account is presented of the methods used in raising fruit-tree seedlings at the John Innes Horticultural Institution, Merton, England. Seeds of stone fruits are removed from fruits and stratified at once in sterilized sand or soil. They are kept all winter in a moist condition in cold frames with full exposure to frost. Early the following year the seeds are removed from the shells and planted in boxes in a cool greenhouse.—Apple seeds are removed from the fruits in the fall and sown directly in the germination flats in cold frames. When germination starts, the flats are taken into the cool greenhouse.—Plum and apple seeds kept dry till late in the winter will not germinate until the following year. Seedlings usually fruited the 6th year from seed. Buds from 2-year old seedlings budded on other stock flowered in 6 years from bud (8 years in all).—*L. H. MacDaniels*.

809. CRUESS, W. V. Rain damage insurance. *Associated Grower* 17: 3, 19, 36. 1920.—For obtaining a high yield of superior evaporated grapes the writer emphasizes the importance of using well ripened fruit. The installation and use of evaporators is considered an economy. [For details see *Bot. Absts.* 6, Entry 1176.]—*E. L. Overholser*.

810. DURHAM, HERBERT E. The recognition of fruit. II. Some systems concerning apples and pears. *Jour. Pomol.* 1: 177-187. 1920.—To date no very satisfactory classification of varieties of apples and pears has been made by which the varietal name of an unknown specimen can be determined. It is in fact doubtful if any such classification can be made on account of the great variation within a variety. A number of such classifications have been proposed; several of these are outlined briefly while that of TRUELLE is given at length.—*L. H. MacDaniels*.

811. FAIRCHILD, DAVID. La papaya injer tada como arbol frutal anual. [The grafted papaya as an annual fruit tree.] *Rev. Agric. [Mexico]* 5: 433-437. 3 fig. 1920.—The possibilities of the grafted papaya (*Carica papaya*) as an annual fruit crop are discussed. Directions for making the grafts and general cultural directions are given.—*John A. Stevenson*.

812. FANTINI, N. Varios sistemas de poda. [Pruning systems.] *Defensa Agric. [Uruguay]* 2: 11-16. 13 fig. 1921.—Popular.—*John A. Stevenson.*

813. HARTMAN, H. Depth of planting in relation to tree growth. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 47-48. 11 fig. 1921.—Young trees of Esopus and Graevenstein apples, d'Anjou pears, and Italian prunes were set at varying depths, ranging from that at which the tree grew in the nursery to 27 inches below that depth. After 4 years there were no striking differences in size and vigor of tops or diameter of trunks. In all cases of deep planting the tendency of growth of the original roots was toward the surface of the soil. The pear trees developed no roots above the graft, the apple trees developed a few though they were of no real importance, whereas the prune trees developed many, but they did not correspond in amount to the development of the tops of the trees.—*E. J. Kraus.*

814. HARVEY, E. M. Summer pruning of young apple trees. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 20-26. Pl. 1-2. 1921.—From experiments designed to test the effect of various combinations of winter and summer pruning and involving 1100 young Rome and Gano apple trees, it appeared that all types of summer pruning allowed less tree growth than winter pruning only; fruit-spur formation was not increased, and the amount of fruit harvested in the case of summer-pruned trees was less than that from those winter-pruned only. Summer-pruning practices must be regulated in accordance with varietal behavior.—*E. J. Kraus.*

815. HARVEY, E. M., AND A. E. MURNEEK. Some relations of growth and bearing of fruit trees to orchard practices. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 15-19. Fig. 5. 1921.—Undeveloped spurs of apple trees were able to form abundant fruit buds and to set a good crop of fruit, while the reverse was true for defoliated spurs. The latter contained relatively more nitrogen and less carbohydrate than the undeveloped spurs. Certain effects of some orchard practices are analyzed on the basis of how they may affect the carbohydrate-nitrogen relationships in the trees.—*E. J. Kraus.*

816. HEDRICK, U. P. Pedigreed nursery stock. *Jour. Pomol.* 1: 155-160. 1920.—Experience at the New York State Experiment Station and extensive reference to the horticultural literature lead to the conclusion that varieties of fruits have not been, and cannot be, improved by bud selection. It is nurture, not nature, that produces the variation in varieties. The present practices in the propagation of fruit trees are justified by the precedents of centuries. The practical difficulties in growing trees from selected buds are almost insuperable, and the burden of proof is upon those who advocate growing pedigreed trees. The author is dealing entirely with deciduous fruits.—*L. H. MacDaniels.*

817. HODSOLL, H. E. P. Manuring fruit trees for continuous crop production. *Jour. Pomol.* 1: 217-223. 1920.—After 4 years' experience with different varieties of apples and other fruit, the writer concludes that it is entirely practicable to produce heavy crops each year by proper use of manures. A "special soluble organic manure" applied in August assures abundant flower-bud formation. This is followed in the winter by a dressing of "lasting organic manure" such as hoof meal, meat and bone meal, or similar materials. This insures sufficient vigor in the tree to support the blossoms and hold the crop. Fruitfulness results when the proportion of elaborated food to mineral nutrients is high. The reverse condition causes vegetative growth only. No data are given.—*L. H. MacDaniels.*

818. HOPPERT, E. H. Extension work in fruit growing in Nebraska. *Proc. Amer. Soc. Hort. Sci.* 17: 91-94. 1920 [1921].—The article deals with the extension work in home apple orcharding in Nebraska. The chief problems considered are proper care of bearing orchards and the correct planting and caring for new home orchards. In the extension work, pruning and spraying demonstrations are given, demonstration orchards are selected, meetings are held, timely articles are written, and exhibits are held at the various county fairs.—*H. W. Richey.*

819. HOWARD, F. K. Training young vines. Associated Grower 1²: 10. 1920.—The single trunk system of training and forming a comparatively high head gives the best results over a long period of years. Permanent stakes are placed at planting time, and, when sufficient growth develops, the strongest and best shoot is tied to the stake. All others are removed except one,—to be used in case of damage to the main branch.—*E. L. Overholser.*

820. KELLEY, W. P. Present status of alkali. Associated Grower 1⁸: 11-12, 38. 1920.—Citrus trees and walnuts are especially sensitive to soil salinity. Water rich in salts and a high irrigation water table are the chief factors causing soil alkalinity. The spread of alkali by the latter method may be avoided by (1) lining or cementing the canals at the outset, and (2) by using better methods of distributing the water, especially by applying less water at a time. Drainage, especially if it be accompanied by flooding, is a reasonably successful means of removing white alkali from soil. Leaching the excess of salts out of the soil and at the same time maintaining chemical and physical conditions favorable to crop growth remains a problem.—*E. L. Overholser.*

821. MELANDER, A. L. The relation of beekeeping to fruit growing. Amer. Bee Jour. 61: 138-139. 1921.—A popular discussion of the advantages of the cross-pollination of fruit trees. For this purpose no insect is so valuable as the honeybee. Many orchardmen pay \$5 per colony for the use of bees during the blooming period of fruit trees.—*J. H. Lovell.*

822. MURNEEK, A. E. "Pedigreed" trees—where do we stand? Better Fruit 15³: 13-15. 15⁴: 6-8. 1921.—Since bud selection for propagating purposes has become of great economic importance with citrus fruits in California, the writer raises the question of its value and practicability with deciduous trees in the Pacific Northwest. Reviewing the work of several experiment stations where bud selection experiments have given negative results, the author concludes that selected or "pedigreed" stocks of deciduous trees are no better than ordinary trees—at least in the light of our present knowledge.—*A. E. Murneek.*

823. MURNEEK, A. E. Stock influence on scion—in regard to top grafting. Better Fruit 15⁷: 3-4, 34-36. 1921.—There are many ways in which the scion may be modified by the stock. The following have been considered in detail: (1) Form and size of the plant, (2) vigor of growth, (3) health, (4) hardiness, (5) productivity and precocity, (6) time of blossoming and maturing of fruit, and (7) longevity. The indirect influence of the stock on the scion, as expressed in changes of character of the fruit, may be as follows: (1) Modification of color, (2) change in size, and (3) changes in eating and keeping quality.—*A. E. Murneek.*

824. MURNEEK, A. E. The storage of Bose pears. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 27-32. Fig. 6-7. 1921.—Time of picking does not materially influence storage quality, except that fruit picked very early must be partially ripened under more humid conditions and for a longer period than fruit picked later. Fruit may be kept for 3 months or longer by the following storage procedure: Delay 10 to 15 days, car temperature 12 to 15 days, then cold storage. Delayed fruit should be held at 60-70 per cent humidity. Both relatively high temperature with low humidity and low temperature with high humidity are harmful to proper ripening.—*E. J. Kraus.*

825. NICHOLS, H. E. New interest in Iowa home orchards. Proc. Amer. Soc. Hort. Sci. 17: 87-91. 1920 [1921].—The article discusses the manner in which spraying demonstrations for the home orchard have developed during the past 10 years. It explains the organization and states the success of spray rings under the direction of the County Agent and the Extension Horticulturist with the cooperation of the Iowa Fruit Growers' Association. Figures are given showing the growth of the movement, the average cost of spraying, and the returns.—*H. W. Richey.*

826. OVERHOLSER, E. L. Fruit exhibits and fruit judging. Associated Grower 1²: 28-30. 1920.—Emphasis is laid on condition, uniformity, color, size, and form,—the 5 main

factors in determining the standard of exhibition fruit. Other necessary details to be borne in mind by the farmer in selecting and exhibiting products, so as to obtain the most satisfactory results, are outlined.—*F. deVilliers*.

827. OVERHOLSER, E. L. The nectarine belongs to the peach family. *Associated Grower* 1¹⁰: 27, 35. 1920.

828. ROBERTS, R. H. Studies in biennial fruiting. *Jour. Pomol.* 1: 197-202. 1920.—Extracts reprinted verbatim from *Proc. Amer. Pomol. Soc.* 1917: 28-33. 1918 (see *Bot. Absts.* 7, Entry 999).—*L. H. MacDaniels*.

829. SCHMIDT, R. Care of old grafted trees and vines. *Associated Grower* 1⁴: 7, 44. 1920.

830. SCHMIDT, R. How to wire limbs bent by fruit. *Associated Grower* 1⁷: 7. 1920.

831. SCHMIDT, R. Summer pruning in raisin vineyards. *Associated Grower* 1²: 10. 1920.—As the plant requires an abundance of leaf surface to make a satisfactory growth, summer pruning should be mild. However, some pruning during the growing season is beneficial especially in 1- and 2-year old plants.—*E. L. Overholser*.

832. SCHUSTER, C. E. Cherry breeding. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 42-43. 1921.—Seedlings of the Bing, Lambert, and Napoleon varieties have proved self sterile but set good crops when open to insect pollination. Resistance to gummosis is variable. A large number produce fruit of excellent quality. The season of maturity is variable, as is also the texture of the flesh; some are suitable for fresh shipment, others for canning.—*E. J. Kraus*.

833. SCHUSTER, C. E. Pollination of the Ettersburg No. 121 strawberry. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 44-46. *Fig. 9-10.* 1921.—The fruit of this variety is very solid, borne on stiff upright stalks, and suitable for canning. All evidence indicates that it is self-fertile and cross pollination does not increase the yield. About 13 per cent of the secondary blossoms mature into fruits, whereas practically all of the primary blossoms mature. Since each plant produces a total of 150-600 blossoms, and of these from 50-54 per cent are considered as primary, normally as many fruits are set as can be matured to good size.—*E. J. Kraus*.

834. SMART, W. A. Control of moss and lichens in the orchard. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 172-173. *Fig. 49.* 1921.—A late fall or winter spray of Bordeaux mixture, 6-6-50, or of lime-sulphur, 1-8, sufficient to saturate the growths will destroy moss and lichens.—*E. J. Kraus*.

835. SNYDER, E. A year's work with Zante currants. *Associated Grower* 1⁷: 26-27. 1920.—Panariti is the main variety of "currants" grown. Ringing has been demonstrated to be a good, as well as a necessary, practice. For drying, the fruit should be fully mature.—*E. L. Overholser*.

836. SNYDER, E. Grafting over old vines. *Associated Grower* 1¹: 5, 43. 1920.

837. SNYDER, E. Timely hints on ringing the Panariti. *Associated Grower* 1²: 6. 1920.—Ringing is best practiced during the blooming period. Preferably each cane should be ringed separately, making 2 cuts $\frac{1}{8}$ - $\frac{1}{4}$ inch apart as close to the base of the cane as possible, and completely removing the bark between the incisions. The resulting clusters are heavier, more compact, and more uniform.—*E. L. Overholser*.

838. TAYLOR, R. H. Next year's peach crop depends on care of trees. *Associated Grower* 1¹: 5-6. 1920.

839. THOMAS, OWEN. Forgotten or discarded grapes. Jour. Pomol. 1: 161-165. 1920.—The author discusses the quality and characters of a number of varieties of grapes, especially those grown in England about 1860.—*L. H. MacDaniels*.

840. WELLINGTON, RICHARD. Grape varieties that produce seedlings of superior merit. Proc. Amer. Soc. Hort. Sci. 17: 37-40. 1920 [1921].—The report deals with about 11,000 grape seedlings grown at the New York Agricultural Experiment Station, and obtained from 37 variety crosses, 38 varieties by seedling crosses, 9 seedling crosses, 163 variety self-fertilizations, 50 seedling self-fertilizations, and a few species crosses. The number of plants in each cross or self-fertilization varied from 1 to over 500.—The author concludes that only 1 individual out of each 1000 will be worthy of perpetuating. The crosses gave proportionately more desirable seedlings than the selfed varieties. Most of the varieties used proved to be poor parents but a few produced a remarkably large number of excellent seedlings. A table is included of the variety crosses and selfed varieties, showing the percentage and number of vines set and number and per cent selected for propagation. The most desirable crosses are Governor Ross \times Mills, Mills \times (Winchess \times Diamond), Triumph \times Mills, and Winchell \times Diamond. Mills has been the leading grape for producing high quality. Diamond produced good quality and Winchell proved of exceptional value in introducing earliness without impairing quality. The author concludes that to produce desirable seedling grapes, *Vitis vinifera* species or derivatives of this species must be depended on for quality and *V. labrusca*, *V. vulpina*, and other American species for hardiness. More certain results will be obtained by crossing rather than selfing and in using varieties that are known to produce superior progeny.—*H. W. Richey*.

841. WHITTEN, J. C. Thinning peaches makes better fruit. Associated Grower 1³: 4. 1920.

842. WILCOX, L. P. Fertilizer experiments with fruits. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 49-51. 1921.—Applications of 3½-5 lbs. of nitrate of soda to the soil under each of a number of old Italian prune trees 1 month before blooming resulted in increased growth and increased number and size of fruits. The time required to dry the fruit was not increased. Applications of the same material at the rate of 250 lbs. per acre to red raspberries at the time the new canes were about 3 inches tall resulted in more and larger canes per plant, and an increased yield of fruits of larger size and better color. There was severe killing of the new canes, which continued to grow into the fall and winter.—*E. J. Kraus*.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

843. AUST, F. A. A state program for landscape extension. Proc. Amer. Soc. Hort. Sci. 17: 54-60. 1920 [1921].—The relation of landscape extension to the sciences is briefly touched upon. Man's need for natural beauty, and the usefulness and beauty of his natural surroundings are discussed. Landscape extension is defined as "The development of the appreciation and the furthering of the practice of the fundamental principles of the art of landscape design, by the citizens of every community." The designer must study the life about him in order to interpret it to the community which he serves. His duty is to teach the public the best in landscape art and to demonstrate the value of professional assistance. "The main function of landscape extension is education." The leaders must cooperate with existing organizations and agencies in order to avoid duplication of effort. The extension program should include: (1) Research in landscape problems, (2) demonstration, (3) lecture work, (4) publication, (5) follow-up work. Types of demonstrational work found effective in Wisconsin are listed and the paper closes with a discussion of the state extension program.—*W. R. Ballard*.

844. BALME, JUAN. Lirio del valle o muguet. [Lily of the valley.] Rev. Agric. [Mexico] 5: 430-432. 4 fig. 1920.—A popular account of the methods used in growing the lily of the valley in the U. S. A. and Europe.—*John A. Stevenson*.

845. DOMINGUEZ, IGNACIO. El cultivo de las plantas florales ornamentales. [Cultivation of ornamentals.] Rev. Agric. [Mexico] 4: 434-437. 1919.

846. McCALL, F. E. Farmstead planting. Proc. Amer. Soc. Hort. Sci. 17: 64-69. 1920 [1921].—The author asserts that the field service of the agricultural colleges can as well be directed toward making country life more beautiful and enjoyable as toward making farming more profitable. Pleasant home surroundings have real value in the development of contented patriotic citizens.—The prairie sections require treatment adapted to the unusual conditions. In South Dakota the aim of the extension workers has been to combine beauty with utility and convenience. The Northern Great Plains have limitations in plant growth which must be recognized. In the planting of trees and shrubs 3 points should be observed as follows: (1) Thorough preparation of the soil, (2) the proper choice of plant materials, and (3) cultivation until plants are well established. General garden literature does not furnish reliable information for the prairie worker. Farmstead planning as practiced in South Dakota includes all those features which contribute to outward convenience and ornamentation. Suggestions under the heads of (1) the farmstead in general, (2) the house, and (3) out-buildings and lots, are given as to special features which should be considered in farmstead planning.—Suggestions are also given for the planting and care of trees and shrubs and a list of ornamentals for South Dakota conditions is appended.—*W. R. Ballard.*

847. WAUGH, F. A. Extension work in landscape gardening. Proc. Amer. Soc. Hort. Sci. 17: 60-64. 1920 [1921].—The distinction is made between the practical art of growing plants and the art of landscape design. The extension worker in landscape gardening should have in mind as his objectives: (1) The inculcation of a love and reverence for the native landscape, (2) the securing of public reservations of various forms, (3) the extension of the knowledge of landscape gardening, (4) the promotion of the development of better farm-home surroundings, (5) the promotion of similar development in towns and cities, (6) the promotion of the development of community equipment, the last being considered the most important field. The farm home furnishes the best point of first attack. The rural school grounds, country playgrounds, country roads, country parks and picnic grounds, state parks and similar large projects, grounds of public institutions and public cemeteries are all legitimate fields of operation. Four principal methods of work are suggested, as follows: (1) Practical or inspirational lectures, (2) publications, (3) organization of clubs and competitions, and (4) professional assistance. The 4th method is the most effective but should be accompanied by the other 3.—*W. R. Ballard.*

848. WILSON, E. H. The "Indian Azaleas" at Magnolia Gardens. Jour. Arnold Arboretum 2: 159-160. 1921.—Mention is made of the most interesting and important species and forms of the collection of Indian Azaleas at Magnolia Gardens, established about 1850 near Charleston, South Carolina.—*Alfred Rehder.*

849. YEAGER, A. F. Shelterbelts for North Dakota. North Dakota Agric. Exp. Sta. Ext. Div. Circ. 43. 7 p., 8 fig. 1921.—The circular contains a list of the best varieties of trees and shrubs and gives methods of planting and care.—*L. R. Waldron.*

VEGETABLE CULTURE

850. BALME, JUAN. La alcachofa. [The artichoke.] Rev. Agric. [Mexico] 4: 517. 1919.—The author gives brief cultural directions for the globe artichoke (*Cynara scolymus*).—*John A. Stevenson.*

851. BOUQUET, A. G. B. Factors affecting production and marketing of broccoli. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 36-39. Fig. 8. 1921.—There is a marked variation in strains, some including cabbage and kale crosses. Greater care in seed production is urged.—*E. J. Kraus.*

852. BOUQUET, A. G. B. Factors affecting shrinkage and condition of broccoli. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 40-41. 1921.—The shrinkage of heads is very much greater if the latter are cut at any time after prime condition. It is preferable even to cut the heads immature rather than when they show signs of curd separation.—*E. J. Kraus.*

853. BOUQUET, A. G. B. Vegetable greenhouse crops in relation to the use of the greenhouse for one season. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 33-35. 1921.—The author gives suggestions on crops which can be produced in the autumn.—*E. J. Kraus.*

854. PITT, J. M. Farmers' experiment plots. Onion trials on the Manning river. 1920-21. Agric. Gaz. New South Wales 32: 261-264. 2 fig. 1921.—The total onion acreage for New South Wales for 1919 was only 335. Yields ran from 2.5 to 4.5 tons per acre. The crop is marketed from November to May and the price secured approximates \$300 per acre. Seedlings were transplanted into the field in July (winter) and the harvest ran from November to January. Most varieties responded very favorably to irrigation. The maximum yield was secured from White Early Barletta, which gave 7.6 tons per acre.—*L. R. Waldron.*

HORTICULTURE-PRODUCTS

855. CHRISTIE, A. W. Dried, evaporated or dehydrated? Associated Grower 1³: 20, 21. 1920.—The term "dried" is applied to all fruits and vegetables preserved by the removal of moisture, irrespective of the method of removal. To the class dried by artificial heat, the names "evaporated" and "dehydrated" are applied, as distinct from "sun-dried."—*E. L. Overholser.*

856. CRUESS, W. V., AND A. W. CHRISTIE. Revised specifications of University Farm evaporator. Associated Grower 1⁵: 8, 40, 41. 1920.

857. GAJÓN, CARLOS. Las rosas para perfumeria.—Su historia. [History of rose growing for perfume] Rev. Agric. [Mexico] 5: 351-358. 13 fig. 1919.—A popular account of the growing of roses for perfume as it is carried on in Spain, Bulgaria, Algeria, India, and France.—*John A. Stevenson.*

858. GIFFEN, W. M. Analysis of federal findings in the raisin situation. Associated Grower 1⁷: 4-5, 46. 1920.

859. JURITZ, CHAS. F. Apricot kernel oil and its congeners. South African Jour. Indust. 3: 1052-1057. 1920.—Descriptions are given of the oils obtained from almond, apricot, and peach pits, with a table showing the composition of apricot-kernel oil as well as the following constants: Specific gravity, saponification value, acid value, refractive index at 40°C., and iodine value.—*A. J. Pieters.*

860. LEGRAND, J. F. El achiote. [Annatto (*Bixa orellana*).] Rev. Agric. [Mexico] 5: 441-442. 1 fig. 1920.—Reprinted from Rev. Agric. Puerto Rico.—*John A. Stevenson.*

861. SCHMIDT, R. Handling the peach crop. Associated Grower 1⁶: 7, 43. 1920.—Trees should not be shaken to obtain peaches for drying. Many of the peaches thus collected are relatively green, have a low sugar content, and yield a poor product; they also lose 10 per cent more in weight than an equal weight of mature peaches.—*E. L. Overholser.*

862. SCHMIDT, R. Sugar content testing for raisins. Associated Grower 1⁶: 9, 44. 1920.—The author recommends the saccharometer as the most convenient instrument for sugar content determinations. The results are sufficiently accurate for ordinary practical purposes provided the necessary temperature corrections are made.—*E. L. Overholser.*

863. WIEGAND, E. H. Some investigations on prune drying. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 52-57. Fig. 12-15. 1921.—Drying is hastened by dipping the fruit in boiling water or lye solution. A high humidity of the drying air has a tendency to open the pores of the skin and prevent charring. High humidity accompanied by rapid air movement increased the rate of drying, slow movement decreased the rate.—*E. J. Kraus.*

MORPHOLOGY, ANATOMY AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 639, 730, 755, 892, 916, 984, 1077)

864. ANONYMOUS. [National Herbarium, Sydney, exhibit.] *Proc. Linn. Soc. New South Wales* 44: 820-821. 1919 [1920].—Note on the exhibit of specimens from the National Herbarium, Sydney, and elsewhere, showing synanthly and syncarpy.—*Eloise Gerry*.

865. ANONYMOUS. [Rev. of: ARBER, AGNES. *The leaves of the irids and the phyllode theory*. (Paper read before Sect. K of the British Assoc. Adv. Sci., August, 1920.)] *Jour. Indian Bot.* 2: 58-59. 1921.

866. DUNN, GRACE A. Note on the histology of grain roots. *Amer. Jour. Bot.* 8: 207-211. *Fig. 4*. 1921.—Characteristic openings were observed in the root cortex of *Zea mays* and *Triticum vulgare* when grown in water culture. In wheat these openings always appeared whether the culture solution was well or poorly balanced and under a wide range of temperatures. Wheat roots grown in sand or soil, however, showed no such openings. In corn, similar results were obtained in the winter, but in summer, when the temperature was high and growth rapid, fast-growing roots in sand and in soil also showed large openings. It is suggested that the openings appear when the oxygen supply is deficient, as it is likely to be in water culture and in all cases where growth is very vigorous and rapid.—*E. W. Sinnott*.

867. FRITSCH, KARL. Über den Begriff der Anisokotylie. [On the concept of anisocotily.] *Ber. Deutsch. Bot. Ges.* 38: 69-73. 1920.—The term anisocotily was proposed by the author in 1904 for the characteristic behavior of the cotyledons of seedlings of certain members of the Gesneriaceae, particularly of the genus *Streptocarpus*. In these plants, and according to the author in none of the plants of other families in connection with which the term has since been used, 1 of the 2 cotyledons, which are approximately equal in size in the seed, develops into a foliage leaf while the other stops growing very soon after germination. He believes that in other cases where the term has been used in reference to unequal size of the cotyledons this inequality exists in the embryo before germination and is due to the cotyledons being bent in the seed or otherwise arranged so that the development of one is mechanically hindered. This condition exists in species of *Gnetum*; in certain genera of the Cruciferae, Moraceae, Phytolaccaceae, Nyctaginaceae, Capparidaceae, Malpighiaceae, Dipterocarpaceae, Cactaceae, and Melastomaceae; and in some species of *Thunbergia* and *Coreopsis*. Cases such as that of *Ranunculus ficaria*, where a single cotyledon is formed by the growing together of 2, have nothing to do with anisocotily. He reiterates, on the basis of observations of J. BRUNNTHALER in South Africa, his formerly expressed belief that true anisocotily, as found there in species of *Streptocarpus*, is connected with the habit which these plants have of growing upon precipitous slopes.—*R. M. Holman*.

868. McDougall, W. B. Thick-walled root hairs of *Gleditsia* and related genera. *Amer. Jour. Bot.* 8: 171-175. *Fig. 3*. 1921.—Root hairs of *Gleditsia triacanthos* become thick-walled and brown within a few days after they are produced. They persist as long as does the root epidermis. These root hairs are regarded by the author as xerophytic structures, persisting from a time when the species grew under xerophytic conditions. Trees with these root hairs have neither bacterial nodules nor mycorrhiza. *Gymnocladus* and *Cercis* sometimes have thick-walled brown root-hairs, but not as characteristically as does *Gleditsia*.—*E. W. Sinnott*.

869. McNAIR, JAMES B. The morphology and anatomy of *Rhus diversiloba*. *Amer. Jour. Bot.* 8: 179-191. *Pl. 2*. 1921.—The morphology and anatomy of the leaf, stem, root, and flower of this species are described in detail.—*E. W. Sinnott*.

870. MEYER, FRITZ JÜRGEN. Das Leitungssystem von *Equisetum arvense*. [The conducting system of *Equisetum arvense*.] *Jahrb. Wiss. Bot.* 59: 263-286. *Fig. 1-7.* 1919.—The author describes the structure and arrangement of all the elements at the node of the aerial sterile stem, the relative positions of protoxylem and metaxylem strands and of the phloem as they pass through the nodal wood; the method of insertion of the leaf and branch traces; the relative positions of the carinal holes in successive internodes and the arrangement of the conducting bundles to conform to these; the path of the conducting system through the nodes and internodes of the rhizome, tuber, leaf of the rhizome, secondary roots, branch roots, sterile stem and its branches and leaves, and the fertile stem and its leaves and cone; the connection between the parts of the system in passing from one organ to another, and the size of the xylem strands both in micromillimeters and in number of tracheids. He discusses the variations in bundle size in different regions of the plant; and the function, size, and formation of the carinal hole.—*J. P. Poole.*

871. MÖBIUS, M. Die Entstehung der schwarzen Färbung bei den Pflanzen. [The origin of black coloration in plants.] *Ber. Deutsch. Bot. Ges.* 38: 252-260. 1920.—The author calls attention to the fact that black coloration in plants is generally not the result of the presence of a truly black pigment but of blue, red, or brown colored substances which, as well as certain histological factors, may produce the same optical effect as would a black pigment. He then presents a classification of the causes of black coloration. Under each of the many headings and subheadings notes are given, and plants are named which illustrate the particular sort of coloration under discussion.—*R. M. Holman.*

872. NEGER, F. W., UND TH. KUPKA. Beiträge zur Kenntnis des Baues und der Wirkungsweise der Lentizellen. I. [Contributions to a knowledge of the structure of lenticels and of the manner in which they function.] *Ber. Deutsch. Bot. Ges.* 38: 141-149. *Fig. 1-6.* 1920.—This paper is concerned with the lenticels of conifers, particularly *Larix*, *Pseudolarix*, *Cedrus*, and *Chamaecyparis*. The tissues which may be found in lenticels of conifers are classified by the authors as: (1) "Choriphelloid," making up the greater part of the lenticels and loose in texture with large intercellular spaces; (2) "Porenkork," strips consisting of a few layers of compact brownish cells generally containing small crystals and with very short radial diameter; (3) "Sklerophelloid," lens-shaped groups of compact cells with strongly thickened walls; and (4) fragments of the primary cortex. A key to the commoner species of *Larix* is given, based on the anatomy of the lenticels, and also a similar key by which *Cedrus Libani*, *C. atlantica*, and *C. Deodara* may be distinguished. Of the 5 species of *Chamaecyparis*, *C. pisifera* alone lacks lenticels. The other species of the genus, as well as *Thuja* and *Juniperus*, and presumably most other Cupressineae, have lenticels of a new type. The center of the lenticel in these forms consists of a large mass of compact "Porenkork," the cells of which are filled with dark brown contents. Exposure of stems to dilute ammonia gas and subsequent examination of the cortical tissue underneath the lenticel for evidence of injury to the living tissue shows that the central mass of "Porenkork" is impermeable to the gas, which, however, finds easy entrance through thin walled cells without brown contents which lie on either side of the "Porenkork" mass.—*R. M. Holman.*

873. OAKLEY, R. A., AND MORGAN W. EVANS. Rooting stems in timothy. *Jour. Agric. Res.* 21: 173-178. *Pl. 39-40.* 1921.—There are 2 distinct types of underground rooting stems of *Phleum pratense*. One type develops when the shoot that produces the new plant is covered with soil early in its growth. In such cases, some of the short internodes at the base of the shoot elongate, thereby pushing the shoot to the surface of the soil. Roots spring from the nodes between these elongated internodes. The other type develops when growing culms are covered with soil. Buds that sometimes form on the culms of such plants frequently develop into shoots and ultimately into independent plants. In this case the culm becomes an underground rooting stem.—Aerial rooting stems in timothy are not common in the United States. They may be formed when weak or decumbent plants come in contact with the soil. This character is not of varietal significance.

There are proposed for the types of rooting stems found, especially in grasses, the following terms: Determinate and indeterminate rhizomes, determinate and indeterminate stolons.—D. Reddick.

874. SCHÜRHOFF, P. N. Der Embryosack von *Tussilago Farfara*. [The embryo sac of *Tussilago Farfara*.] Ber. Deutsch. Bot. Ges. 38: 217-219. Fig. 1. 1920.—It is the micropylar megaspore which develops into the embryo sac in this plant. Preparations of mature embryo sacs showed 6 2-nucleate antipodals, or 6 4-nucleate, or 12 2-nucleate, so that in most cases 24 antipodal nuclei were present. Although in some Compositae in which the micropylar megaspore develops into the embryo sac the other 3 megaspores take part in the development of the antipodal tissue, that is not the case in *Tussilago Farfara*. The author calls attention to the apparent systematic significance of the development of the chalazal or of the micropylar megaspore into the embryo sac in different tribes of the Compositae.—R. M. Holman.

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

(See also in this issue Entry 663)

875. CORBIÈRE, L., ET E. JAHANDIEZ. Muscinées du Département du Var. [Bryophytes of the department of the Var (France).] Ann. Soc. Hist. Nat. Toulon 4 (Suppl.): 1-63. 1921.—The present report on the bryophytes of the department of the Var is dedicated to the late Lieut. M. MOURET, upon whose collections it is largely based. After citing the earlier works which deal with the region in question, the authors enumerate 248 mosses and 51 hepatics, omitting certain records about which the evidence seems to be insufficient. Each species is accompanied by full data regarding stations and collectors, and many critical notes are interpolated, those dealing with *Fissidens Mouretii* Corb. and *Grimmia Pitardi* Corb. being particularly full. The following new varietal names or combinations are proposed: *Cephalozia Turneri* var. *dentata* (Raddi) Douin, based on *Jungermannia dentata* Raddi in part; *Fabronia pusilla* var. *nervosa* Thériot, based on *F. Schimperiana* Br. eur. not De Not.; and *Trichostomum brachydontium* var. *unguiculatum* (Philib.) Corb. & Jahand., based on *Hymenostomum unguiculatum* Philib. and including *Weisia Alberti* Corb. as a synonym.—A. W. Evans.

876. FLEISCHER, MAX. Über die Entwicklung der Zwergmännchen aus sexuell differenzierten Sporen bei den Laubmoosen. [Development of dwarf males from sexually differentiated spores in the mosses.] Ber. Deutsch. Bot. Ges. 38: 84-92. Pl. 2 (colored), 1 fig. 1920.—The author worked particularly on the following 3 species: *Macromitrium Blumei*, *Schlotheimia Koningsbergeri*, and *Trismegistia Brauniana*. In all 3 species he found that the male plants were always dwarf and epiphytic on the female plants. A morphological difference thus exists between male and female plants. Evidence was abundant that the dwarf male plants developed from a primary protonema, that is, had their origin in spores which lodged on the vegetative portions of the female plants. In the *Macromitrium* and the *Schlotheimia* spores of different sizes were found, and the larger spores, containing the greater supply of food, gave rise apparently to the dwarf plants. In *Trismegistia Brauniana* dwarf female plants, as well as dwarf male plants, were found on normal female plants. The dwarf female plants, however, were too young to show archegonia and would probably have developed into normal female plants. These various observations lead the author to conclude that the protonemata of these 3 species are dioecious and that heterospory (sexual differentiation) exists in the spores.—H. Bergfried.

877. FLEISCHER, MAX, UND LEOPOLD LOESKE. Iconographia bryologica universalis.—Abbildungen von Moosen aus allen Erdteilen nach Originalzeichnungen sowie aus bryologischen Werken. Serie I: Auswahl von Abbildungen aus Loeske: "Die Laubmoose Europas." [Universal bryological iconography. Illustrations of mosses from all parts of the earth according

to original drawings or from bryological works. Series I: Selection of illustrations from Loe-ske's "Mosses of Europe." 40 pl. Max Lande: Berlin-Schöneberg, 1918.—The present fascicle is the initial number of a series in which it is planned to illustrate a wide selection of mosses. The 40 plates were all drawn from European specimens and represent 80 species belonging to 36 genera. The figures were mostly prepared by P. JANZEN and show individual plants, leaves, and capsules, as well as numerous anatomical details. In connection with each plate, full data are supplied regarding the figures, and the sources of the specimens used in the preparation of the drawings are likewise definitely given. Otherwise there is no descriptive text.—A. W. Evans.

878. HOLZINGER, JOHN M. Notes [on *Physcomitrium pygmaeum*]. Bryologist 24: 26–27. 1921.—The article consists of 2 notes supplementary to a paper by ELIZABETH G. BRITTON. The 1st note states that *Physcomitrium pygmaeum* is probably autoicous and adds details regarding spores; the 2nd note records a new station in Minnesota, based on material collected by J. H. SANDBERG, and establishes definitely the autoicous inflorescence of the species.—E. B. Chamberlain.

879. POTTIER, JACQUES. Recherches sur le développement de la feuille des mousses. [Studies on the development of the leaf in mosses.] 25 × 61 cm., viii + 144 p., 32 pl. Imprimerie Durand: Chartres, 1920.—The author first gives a critical account of the work previously done on the development of moss leaves, beginning with an article by MORREN, which appeared in 1840. His own investigations were made on serial microtome sections, and in several cases reconstructions of young leaves in plastiline were prepared. The mosses studied included the following species, representing various natural groups: *Andreaea crassinervia*, *A. angustata*, *Mnium undulatum*, *M. punctatum*, *Funaria hygrometrica*, *Dicranum scoparium*, *Atrichum undulatum*, *Barbula ruralis*, and *Leucobryum glaucum*. *Andreaea crassinervia* and *Mnium undulatum* are described and figured in great detail, and plastiline models of leaves in various stages of development are shown in photographic reproduction. The other species are treated more briefly. As a result of his studies the author draws the following conclusions: (1) A moss leaf grows by means of an initial cell only at the beginning of its development; (2) the region of active cell division, in the course of the ontogeny of the leaf, is shifted from the apex to the base; (3) the apex is differentiated very early; (4) in certain species of *Andreaea* with costate leaves, the initial cell sometimes shows 2 cutting faces, as in the more highly evolved mosses; (5) in *Mnium punctatum*, the leaf-margins are not comparable with the nerve in their development; (6) groups of "sténocystes" (auxiliary cells) in the nerve do not always originate in the same way; (7) *Leucobryum glaucum* shows an asymmetry in its leaves, agreeing in this respect with the other mosses.—A. W. Evans.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

(See also in this issue Entries 653, 980, 1030, and those in the section Pathology)

FUNGI

880. BEELI, M. Note sur le genre *Meliola* Fr. Espèces et variétés nouvelles recoltées au Congo. [Note on the genus *Meliola* Fr. New species and varieties collected in the Congo.] Bull. Jard. Bot. Etat [Bruxelles] 7: 89–160. 1920.—A general synopsis of the species of *Meliola* based on morphological characters and host relationships is given. A number of new species and new varieties are described. A new genus, *Meliolinopsis*, is founded for species with cylindrical, persistent, 8-spored asci, the type species being given as *M. megalospora* (Rehm) Beeli. The 2 genera, *Meliola* and *Meliolinopsis*, are recognized, the former being subdivided into the sub-genera *Meliolina*, *Irene*, and *Meliolaste*. An analytical key to genera and sub-genera is given.—Henri Micheels.

881. DANA, B. F. Two new species of *Sclerotinia*. [Abstract.] *Phytopathology* 11: 106. 1921.—*Sclerotinia demissa* n. sp. attacks leaves, twigs and fruits of *Prunus virginiana*. *Sclerotinia gregaria* n. sp. attacks the leaves and fruits of *Amelanchier cusickii*.—B. B. Higgins.

882. DOIDGE, ETHEL M. Some changes in nomenclature of South African Ascomycetes. *South African Jour. Nat. Hist.* 2: 39-41. 1920.—A number of changes in the nomenclature of South African Ascomycetes have been rendered necessary by the appearance of the recent work of Theissen and Sydow. Thirteen new combinations resulting from the transfer of species from *Meliola* to *Irene* are here given.—E. M. Doidge.

883. GERHARDT, KARL. Über das Auftreten der Schlauchfrüchte von *Oidium Tuckeri* am Weinstock. [On the appearance of ascocarps of *Oidium Tuckeri* on grapevines.] *Ber. Deutsch. Bot. Ges.* 38: 156-158. 1920.—In October and November, 1919, the author found perithecia of *Uncinula necator* on old plants of grape in the Jena botanical garden. This is only the 2nd reported occurrence of the ascocarps in Germany. The author describes the perithecia and reports attempts, as yet unsuccessful, to germinate the ascospores. He attributes the production of the perithecia to the unusually abrupt fall in temperature in the vicinity of Jena in the middle of October 1919. Their absence from green leaves, relative scarcity on red leaves, and abundance on yellow fallen leaves in which no anthocyanin had been formed suggested a disturbance of transfer of material in the leaf resulting from the sudden depression of the temperature as the cause of the production of the ascocarps.—R. M. Holman.

884. HÖHNEL, FRANZ VON. Über *Pseudopeziza*, *Pyrenopeziza*, *Ephelina*, und *Spilopodia*. [On *Pseudopeziza*, *Pyrenopeziza*, *Ephelina*, and *Spilopodia*.] *Ber. Deutsch. Bot. Ges.* 38: 96-101. 1920.—The author discusses the synonymy and relationships of these genera. He considers the genus *Pyrenopeziza* to be made up in part of overwintered forms of *Pseudopeziza*. The remaining species of the genus *Pyrenopeziza* he assigns to the genus *Excipula*.—R. M. Holman.

885. HÖHNEL, FRANZ VON. Über die Gattung *Phlyctaena* Desmazières. [On the genus *Phlyctaena* Desmazières.] *Ber. Deutsch. Bot. Ges.* 38: 102-110. 1920.—The author states that 2 fungi, in his opinion generically distinct, were described as the type of this genus under the name *Phlyctaena vagabunda*. One of these grew on the stem of *Psoralea bituminosa*, the other on that of *Tamus communis*. Inasmuch as the fungus on *Tamus* has typical pycnidia, in contradiction to Desmazières' generic description, and since the fungus on *Psoralea* was described as having false perithecia formed only by the blackened epidermis, the writer concludes that the fungus on *Psoralea* is the type species of the genus. The form growing upon *Tamus* he considers identical with *Ascochyta caulium* Libert, and concludes on the basis of characteristics indicating its close affinity to *Rhabdospora* that it must be called *R. caulium* (Lib.) v. H., at least until a critical investigation of the genus *Rhabdospora* is undertaken. The synonymy of other published species of *Phlyctaena* is also discussed.—R. M. Holman.

886. HÖHNEL, FRANZ VON. Über *Botryosphaeria*, *Epiphyma* und *Pilgeriella*. [On *Botryosphaeria*, *Epiphyma*, and *Pilgeriella*.] *Ber. Deutsch. Bot. Ges.* 38: 111-116. 1920.—The author discusses the synonymy and relationships of a number of species of the genera named. He states that *Gibberella* Sacc. 1877 is the same as *Botryosphaeria* Ces. et de Not. 1863, that according to the laws of nomenclature the species of *Gibberella* must be placed in *Botryosphaeria* Ces. et de Not., and that for the species of the genus *Botryosphaeria* Sacc. the name *Melanops* Nitschke 1869 must be employed. The author denies the sharp distinction which Theissen assumes in the development of the nucleus of the Pseudosphaeriaceae, Sphaeriales, and Dothideales. *Botryosphaeria* Sacc. 1877 he considers a genus of the Dothideaceae. *Botryosphaeria* *Dothidea* (Moug.) Ces. et de Not. he places in *Catacauma* as *C. Dothidea* (Moug.) v. H. The author's *Botryosphaeria* *Molluginis*, which was placed by Theissen and Sydow (*Ann. Mycologici* 13: 297. 1915) in the genus *Amerodothis*, he now, on the basis of further study, places in *Dothidella* as *D. Periclymeni* (Fekl.) var. *Molluginis* v. H. or *Dothi-*

della Molluginis v. H.; and *Botryosphaeria anceps* v. H. he transfers provisionally to *Wallrothiella*. He questions whether the new genus *Epiphyma* established by Theissen for the fungus last mentioned is sufficiently distinct from *Wallrothiella* and states that in any event it is not one of the Pseudosphaeriaceae. *Pilgeriella perisporioides* P. Henn., though superficial in its growth, he considers a typical member of the Pseudosphaeriaceae.—R. M. Holman.

BACTERIA

887. JENNISON, HARRY MILLIKEN. *Bacillus atrosepticus* van Hall the cause of the black-leg disease of Irish potatoes. [Abstract.] *Phytopathology* 11: 104. 1921.—A comparative study of subcultures from *Bacillus atrosepticus* van Hall, *B. phytophthorus* Appel, *B. solonisaperus* Harrison, *B. melanogenus* Pethybridge and Murphy, and of the potato blackleg organism isolated from diseased potatoes in various parts of the United States, show that they are all the same organism. Because of priority *Bacillus atrosepticus* van Hall is retained as the proper name for the organism.—B. B. Higgins.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

(See also in this issue Entries 668, 769, 1100)

888. BERRY, EDWARD W. A palm nut from the Miocene of the Canal Zone. *Proc. U. S. Nation. Mus.* 59:21-22. *Fig. 3.* 1921.—The author describes the nuts of *Iriartites Vaughani*, a new species, from the Miocene Gatun formation of the Panama Canal Zone.—E. W. Berry.

889. BERRY, EDWARD W. Tertiary fossil plants from Costa Rica. *Proc. U. S. Nation. Mus.* 59: 169-185. *Pl. 22-27.* 1921.—In addition to *Heliconia* sp., *Hieronymia lehmanni*, *Buettneria cinnamomifolia*, and *Nectandra areolata*, the author describes the following new species from the Miocene of Costa Rica: *Piperites cordatus*, *P. quinquecostatus*, *Ficus talamancana*, *Anona costaricana*, *Inga sheroliensis*, *Goeppertia tertiaria*, *Nectandra woodringi*, and *Phyllites costaricensis*.—E. W. Berry.

890. BERRY, EDWARD W. [Rev. of: ARBER, E. A. N. *Devonian floras*. 100 p., 47 fig. University Press: Cambridge, 1921 (see Bot. Absts. 8, Entry 2086).] *Amer. Jour. Sci.* 1: 514-515. 1921.

891. SAHNI, B. Petrified plant remains from the Queensland Mesozoic and Tertiary formations. *Queensland Geol. Surv. Publ.* 267. 48 p., 5 pl., 10 fig. 1920.—This paper gives the results of a study of large collections of petrified woods from the Triassic, Jurassic, and Tertiary of Queensland. The 2 petrified fern stems described by KIDSTON and GWINNE VAUGHAN as *Osmundites gibbiana* and *O. dunlopi* from the Jurassic of Otago, New Zealand, are recorded from the Jurassic Walloon series of Queensland. The following new species of coniferophyte woods are described: *Cedroxylon brisbanense* from the Triassic Ipswich series; *Cupressinoxylon walkomi*, *C. dunstani*, and *Mesembrioxylon sewardi* from the Jurassic Walloon series; and *M. fusiforme* and *M. fluviatile* from the Tertiary. The genus *Mesembrioxylon* is a recent proposal of Seward for woods from the Jurassic to the Tertiary which resemble *Podocarpus* and *Phyllocladus*, but of uncertain botanical affinity. Two different species of dicotyledonous woods are described from the Tertiary, *Pataloxylon scalariform* and *P. porosum*; the genus is new, and no hint as to its botanical affinity is given.—E. W. Berry.

892. WIELAND, G. R. Monocarpy and pseudomonocarpy in the cycadeoids. *Amer. Jour. Bot.* 8:218-230. *Pl. 4, fig. 1.* 1921.—The author discusses, with illustrations, the monocarpic habit or the production of fruit once in a normal lifetime. This habit is confined at present to angiosperms. He suggests that certain of the Cretaceous cycadeoids were also monocarpic, since specimens have been found in which great numbers of cones, all apparently of the same age, are borne over the whole trunk, indicating that the plant had entered its single reproduc-

tive period. A case of "pseudomonocarp" is cited in *Pinus attenuata*, where the mature cones do not drop off but are embedded in the trunk and often do not shed their seeds till the tree dies. The author also calls attention to the xerophyllous characters of the cycadeoids, as shown particularly by the dense masses of scaly ramentum with which the stems and leaves are covered. He believes that the early Cretaceous climate, under which they thrived, was a rather dry and cool one.—*E. W. Sinnott.*

893. YABE, H., AND S. ENDO. Discovery of stems of a Calamites from the Paleozoic of Japan. Sci. Rept. Tohoku Imp. Univ. (Geology) 5³: 93-95. Pl. 15, fig. 7-8. 1921.—A detailed description and illustration of a calamite of the Arthropitys type from the marine Chichibu formation (upper Paleozoic) of Japan is presented.—*E. W. Berry.*

PATHOLOGY

G. H. COONS, *Editor*

C. W. BENNETT, *Assistant Editor*

(See also in this issue Entries 612, 639, 644, 653, 735, 791, 794, 832, 881, 887)

PLANT DISEASE SURVEY (REPORTS OF DISEASE OCCURRENCE AND SEVERITY)

894. ANONYMOUS. Mosaic disease of canes. Jour. Jamaica Agric. Soc. 24: 313-314. 1920.—A report of the occurrence of the mosaic (mottling) disease of sugar cane in Jamaica is given. Governmental regulations providing for the eradication of the disease are also given.—*John A. Stevenson.*

895. ANONYMOUS. Plaga blanca de las cebollas. [White disease of onions.] Rev. Agric. [Mexico] 5: 601-602. 1 fig. 1920.—A disease of onions due to *Fusarium* sp. has caused losses to growers near Ciudad Victoria, Tamaulipas, Mexico.—*John A. Stevenson.*

896. BYARS, L. P. Notes on the citrus-root nematode, *Tylenchulus semipenetrans* Cobb. Phytopathology 11: 90-94. Fig. 1. 1921.—Examination of trees in all the principal Citrus growing sections of Florida indicates that the nematode disease of Citrus trees occurs in only 3 isolated localities, namely, Glen St. Mary, Gainesville, and Brooksville. Tests of the hot water treatment for infested seedlings indicate that it may be developed into a feasible method of control.—*B. B. Higgins.*

897. GARRETT, A. O. Septoria Negundinis Ellis & Ev. in Zion National Park. Phytopathology 11: 100. 1921.

898. HEALD, F. D. Some new hosts for the Rhizoctonia disease. [Abstract.] Phytopathology 11: 105. 1921.—*Rhizoctonia* has been found attacking strawberries (*Fragaria* sp.) and wild onions (*Allium* sp.).—*B. B. Higgins.*

899. HEALD, F. D. The skin spot (*Oospora pustulans*) of the Irish potato. [Abstract.] Phytopathology 11: 104-105. 1921.—In a car load of potatoes shipped from British Columbia 95 per cent showed lesions of this disease.—*B. B. Higgins.*

900. JENNISON, HARRY MILLIKEN. Observations upon the bacterial blight of field and garden peas in Montana. [Abstract.] Phytopathology 11: 104. 1921.—A very serious disease of field and garden peas (*Pisum sativum* L.) is produced by *Pseudomonas pisi* Sack. Dissemination is thought to be due largely to contaminated seed.—*B. B. Higgins.*

901. MADARIAGA, A. Plagas y enfermedades del maiz. [Diseases and pests of corn.] Rev. Agric. [Mexico] 4: 449-455. 1919.—The rust (*Puccinia*) and smut (*Ustilago maydis*) of Indian corn are discussed.—*John A. Stevenson.*

902. MEDALLA, M. G., AND G. M. REYES. Fiji disease of sugar cane. Philippine Farmer 7: 3, 5. 1921.—The paper presents a discussion of Fiji disease to the sugar cane growers of the Philippines. The disease is described and its recent introduction into the Philippines demonstrated. According to the authors it is at present confined to the Islands of Mindoro and Luzon. The organism (suspected of being of protozoan nature) discovered by Dr. H. L. LYON is constantly associated with the disease. Control attempts in the Philippines have been undertaken based upon: (1) A domestic quarantine of the affected provinces; (2) the distribution of resistant varieties in provinces where the disease occurs; and (3) selection of disease-free seed on affected plantations.—H. Atherton Lee.

903. MELCHERS, L. E. Physoderma (zeae-maydis?) in Kansas. Trans. Kansas Acad. Sci. 29: 131-132. 1920.—The presence of this fungus in Kansas on *Zea mays* is noted; pertinent characteristics are given.—F. C. Gates.

904. MELCHERS, L. E. Plant disease report for Kansas, 1917. Trans. Kansas Acad. Sci. 29: 132-138. 1920.—The paper contains a brief report of the distribution and severity of 25 cereal diseases, 11 vegetable diseases, 16 fruit diseases, and winter injury.—F. C. Gates.

905. RAMÍREZ, ROMÁN. Viruela del algodón. [Cotton rust.] Rev. Agric. [Mexico] 5: 461. 3 fig. 1920.—Cotton rust caused by *Aecidium gossypii* E. & E. has caused losses to growers in Coahuila and Durango, Mexico.—John A. Stevenson.

906. SIMONETTO, MOISÉS. Nuevas orientaciones en sanidad vegetal. [New situations in plant pathology.] Rev. Agric. Com. y Trab. [Cuba] 3: 349-356. 4 fig. 1920.—In part 1 of the paper are discussed the dangers of the importation of plant diseases and the preventive measures that may be taken. A floating fumigation building is suggested and described. In part 2 reference is made to a convention on plant sanitation held in Washington on December 20, 1920. In part 3 an outline is presented of urgently needed investigation on the concomitant causes of the mosaic of sugar-cane. In part 4 it is pointed out that in some cases mosaic disease has caused losses reaching 50 per cent and is thus a real danger to Cuban sugar-cane growers. One focus of infection located at the Mercedes plantation is said to have been controlled.—F. M. Blodgett.

907. TRUJILLO PELUFFO, AGUSTIN. Desarrollo de las enfermedades criptogámicas en las viñedos durante el presente año. [Fungous diseases in the vineyards during the present year.] Defensa Agric. [Uruguay] 2: 43-46. 3 fig. 1921.—Powdery mildew (*Oidium*), anthracnose (*Gloeosporium*), and downy mildew (*Plasmopara*) have caused heavy losses due in part to weather conditions (high humidity) but to a larger extent to the failure of the growers to spray at the right time and in a careful manner.—John A. Stevenson.

THE HOST (RESISTANCE; SUSCEPTIBILITY; MORBID ANATOMY AND PHYSIOLOGY)

908. HURD, ANNIE MAY. Seed-coat injury and viability of seeds of wheat and barley as factors in susceptibility to molds and fungicides. Jour. Agric. Res. 21²: 99-122. Pl. 13-23. 1921.—An unbroken seed coat affords protection against attack of living seeds by *Penicillium* sp. or *Rhizopus nigricans* either in damp storage, in the soil, or in blotter germinations; but infection may occur on such seeds if germination is retarded by means of low temperature. By means of artificial injuries, it is found that injury over the endosperm results fatally when either organism is present and under any 1 of the 3 conditions mentioned, while an injury over the embryo is not at all detrimental. Seeds that are dead or weakened from any cause are attacked by these fungi even though the seed coat is intact. These fungi do not affect seeds when the temperature is 10°C. or lower and *Penicillium* sp. requires an atmospheric humidity of 80 per cent. *Aspergillus* sp. grows on wheat at a humidity of 70 per cent.—Seeds mechanically injured and exposed to copper sulphate solution [3 per cent] are injured in 5 minutes when the break is over the embryo and in 1 hour if the break is over the endosperm.—The dam-

age that will be done to seed wheat by copper-sulphate treatment and by saprophytic fungi can be predicted by examination of the physical condition of the seed for mechanical injury and the location of the injuries. Machine thrashing usually breaks seed coats of wheat directly over the radicle. Turkestan barley and varieties of similar structural type are broken at the hilum either in machine or hand thrashing and barley seed is more easily injured than wheat seed.—Perfect wheat seed is injured by exposure to saturated copper sulphate solution for 6 hours or more, indicating that the seed coat is not completely semipermeable.—*D. Reddick.*

909. KORSTIAN, CLARENCE F., CARL HARTLEY, LYLE F. WATTS, AND GLENN G. HAHN. A chlorosis of conifers corrected by spraying with ferrous sulphate. *Jour. Agric. Res.* 21³: 153-171. 4 fig. 1921.—All coniferous species grown in a nursery in Idaho are affected with chlorosis. With chlorosis is associated poor growth of roots, stems and leaves, failure to form terminal buds, and susceptibility to winter injury. Excessive soil moisture does not seem to be a factor in producing a chlorotic condition. The soils on which chlorosis of conifers occurs all contain considerable amounts of carbonate and have been formed in part from limestone. The water supply at one nursery contains much calcium bicarbonate. No correlation could be found between occurrences of chlorosis and the amount of calcium or of carbonate present. Chlorosis in western yellow pine, *Pinus ponderosa*, and jack pine, *P. banksiana*, has been definitely corrected by spraying the plants at 10-day intervals with 1 per cent ferrous sulphate. Douglas fir, *Pseudotsuga taxifolia*, gave similar but less decisive results. Sulphate of iron of 2 per cent strength is injurious.—The literature on chlorosis is reviewed and a bibliography of 24 titles appended.—*D. Reddick.*

910. LEE, H. ATHERTON. The increase in resistance to citrus canker with the advance in maturity of citrus trees. *Phytopathology* 11: 70-73. 1921.—On the evidence obtained through extensive field observations, the hypothesis is advanced that as citrus trees advance in maturity there is a gradual increase in their resistance to citrus canker. Citrus trees of the more resistance species, *Citrus nobilis*, *C. mitis*, etc., often show great susceptibility to canker when young while more mature trees are practically free from injury. This is apparently true also, to a less noticeable extent, of the more susceptible species.—*B. B. Higgins.*

911. SCHAFFNIT, E. Untersuchungen über die Brennfleckenkrankheit der Bohnen. [Investigations on anthracnose of beans.] *Mitteil. Deutsch. Landw. Ges.* 36: 199-201. 1921.—Bean varieties resistant and susceptible to anthracnose were grown with various fertilizers, especially those supplying an excess of nitrogen. The plants as well as controls were inoculated with the anthracnose organism, but no appreciable change in relative resistance was found as a result of the fertilizer applications. Greater diastase and protease content was found in the susceptible than in the resistant varieties.—*Wilber Brotherton, Jr.*

THE PATHOGENE (BIOLOGY; INFECTION PHENOMENA; DISPERSAL)

912. BURKHOLDER, WALTER H. The bacterial blight of bean: a systemic disease. *Phytopathology* 11: 61-69. 1921.—The bean blight organism (*Bacterium phaseoli*) may infest the vascular system of the bean (*Phaseolus vulgaris*) plant, with or without the production of surface lesions and symptoms of bean blight as generally noted. The bacteria in the cotyledons of plants from infected seed may enter the vessels and pass down into the stem of the young plants. The symptoms produced by this vascular invasion appear to depend, in some way, on environmental conditions. The plants may wilt at once, lesions may appear on the stems and leaves, or the plants may show incipient wilting or dwarfing without the appearance of definite lesions. The seeds are often invaded through the vessels without the production of lesions on either the seed coat or the pod.—This systemic infection does not produce the greatest amount of damage, but it is of importance in seed selection. It also acts as an important source of infection for the peculiar epidemics of blight which appear in late summer.—*B. B. Higgins.*

913. HEALD, F. D. Relation of spore load to the per cent of stinking smut (*Tilletia tritici*). [Abstract.] *Phytopathology* 11: 103-104. 1921.—The per cent produced is approximately proportional to the number of smut spores per grain of wheat until the maximum is reached, between 65,000 and 100,000 per grain.—*B. B. Higgins*.

914. HEINRICHER, E. *Arceuthobium Oxycedri* (DC.) M. Bieb auf *Cupressus*. [*Arceuthobium Oxycedri* (DC.) M. Bieb on *Cupressus*.] *Ber. Deutsch. Bot. Ges.* 38: 220-223. 1920.—This paper is a report of experiments carried out with the intention of testing the ability of the organism named to attack *Pinus silvestris*, *Cupressus pendula*, and *Chamaecyparis pisifera*. Positive results were secured with *Cupressus* spp. only. Since only 1 out of 67 seeds sown on the cypress developed into a plant on that host the author does not consider the negative results with *Chamaecyparis* as conclusive evidence of the parasite's inability to use the latter as a host.—*R. M. Holman*.

915. MORSE, W. J. The transference of the potato late blight by insects. *Phytopathology* 11: 94-96. 1921.—A case is noted where the spores of the potato late blight fungus (*Phytophthora infestans*) were apparently carried 150 yards by flea beetles (*Epiditrix cucumeris*).—*B. B. Higgins*.

DESCRIPTIVE PLANT PATHOLOGY

916. ANONYMOUS. Degeneración de la papa y manera de evitarla. [Degeneration of the potato and means of preventing it.] *Rev. Agric. [Mexico]* 4: 415-421. 5 fig. 1919.—Degeneration of potato varieties is due partly to *Phytophthora infestans* and other fungi and partly to unknown causes. The tendency of certain varieties toward degeneration, expressed by low yields, spindling sprouts and related phenomena, is often allied with smooth, shallow-eyed tubers. A lack of diastase in the tubers and poor fibro-vascular development also mark this condition.—*John A. Stevenson*.

917. ANONYMOUS. Report on Pè-byu-gale disease and the application of measures to check its spread, 1918-19. Appendix to Ann. Rept. Agric. Sta., Agric. Chem., Agric. Eng., Asst. Bot. Northern Circle, and Asst. Entomol. Burma 1918-1919: 95-99. 1 map. 1920.—This is a sclerotial disease on Pè-byu-gale (*Phaseolus lunatus* L.) reported as exceedingly destructive over localized areas near Mandalay, Burma. Despite burning badly infected fields, and rotation of crops, the disease is spreading. [See also Bot. Absts. 9, Entry 941.]—*Winfield Dudgeon*.

918. BARSS, H. P. Bean blight and bean mosaic. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 192-196. Fig. 56-59. 1921.—Notes and recommendations are given relative to the occurrence and control of blight, probably caused by *Bacterium phaseoli*, and of mosaic. The variety Berrendo from Mexico shows no symptoms of mosaic even when artificially inoculated, yet after inoculation it may transmit the disease to other varieties.—*E. J. Kraus*.

919. BARSS, H. P. Physiological disorders of developing fruits. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 159-166. Fig. 44-47. 1921.—The following are assumed to be due to a lack of adjustment between water needs and water supply: (1) Shriveling of grapes; (2) drouth spot, cork, blister, punk, and bitter pit of apple; (3) black end of pears and of walnuts; (4) gum spot of prunes; and (5) internal browning of potato.—*E. J. Kraus*.

920. BIANCHI, ANGEL T. Enfermedades de la papa. [Potato diseases.] *Defensa Agric. [Uruguay]* 2: 31-32. 1921.—*Phytophthora infestans*, *Fusarium solani* (dry rot), and *Bacillus amylobacter* (wet rot) are considered.—*John A. Stevenson*.

921. BRYON, MAY K. A bacterial budrot of cannas. *Jour. Agric. Res.* 21³: 143-152. Pl. 31-38. 1921.—The disease is essentially one of young tissue and moist conditions in *Canna indica*. The lesions vary from small spots to brown irregular areas extending several centimeters along the leaf blade. Young shoots are often killed, the flower buds blighted, and

the stalks decayed. The disease is known only from Washington, D. C., and Urbana, Illinois. The cause of the disease is *Bacterium cannae* n. sp., group number 211. 3333023. Cultural and other biological characters are presented in detail. Infection takes place through stomates and spreads through the intercellular spaces of the parenchyma of leaf blade, petiole, and stalk. Overcrowding and overwatering of young plants in the hothouse seem to be predisposing factors. Avoidance of these conditions is at present the only known means of controlling the disease.—D. Reddick.

922. GARDNER, MAX W., AND JAMES B. KENDRICK. Bacterial spot of tomato. Jour. Agric. Res. 21²: 123-156. Pl. 24-28. 1921.—Bacterial spot of tomato [*Lycopersicum*] is widely distributed in North America. It is a typical spot disease of fruit, stem, and leaf. It occurs on practically all varieties of tomatoes and also on pepper [*Capsicum*]. Infection of potato foliage has been secured. The disease is caused by *Bacterium exitiosum* n. sp., group number 211. 3332513. Cultural and other biological characters are described in detail. The organism produces no acid or gas with carbohydrates, is highly sensitive to sunlight, very resistant to desiccation, and has its limit of acid toleration at P_H5.—Infection of foliage is stomatal and is readily secured by atomizer inoculations; fruit infections occur only through wounds. Mature fruits are not infected and this is attributed to high acidity. The organism overwinters on the surface of seed and is thus disseminated. Disinfection of seed in mercuric chloride, 1 to 3000, for 5 minutes is safe and effective for control.—The paper is a monographic treatise.—D. Reddick.

923. GENTNER, GEORG. Eine Bakteriose der Gerste. [A bacteriosis of barley.] Centralbl. Bakt. II. Abt. 50: 428-441. Fig. 2. 1920.—A monographic treatise on a bacterial disease of barley, occasionally found on wheat and rye. The disease is characterized by the appearance of brown spots on the nodes and upper internodes. The leaves of diseased plants are covered with brown blotches or dots, the upper ones becoming prematurely yellow and dry. The disease is further characterized by the production of poorly filled heads with prematurely filled kernels. The glumes may become split. In extreme cases, the kernels may show longitudinal rifts extending deep into the endosperm. The disease is caused by *Bacillus cerealium* n. sp., described as follows: Short, motile rod, 1.5-3 × 0.6-0.8μ, with 1-2 polar flagella; spore forming, aerobic, non-liquefying, red-pigment producing on media. The bacillus is capable of dissolving the middle lamella, starch grains, and cell walls in the interior of the kernel, but not in the hull. It does not dissolve cellulose of filter paper, nor does it rot potato or carrot. The cleavage products and the pigment produced are dextrin-like. The disease is most common in dry seasons. The organism persists in the soil and in the grain, which under conditions of moist storage may become seriously infested.—Anthony Berg.

924. HEALD, F. D. Moldy core of Stayman Winesap. [Abstract.] Phytopathology 11: 105. 1921.—Several species of fungi have been found producing a moldy growth in the core of apples having an open calyx; but of these only species of *Penicillium* and of *Alternaria* produced a decay of the fruit.—B. B. Higgins.

925. HOTSON, J. W. A new species of *Exobasidium*. [Abstract.] Phytopathology 11: 106. 1921.—A new, as yet unnamed, species of *Exobasidium* attacks the young branches of *Vaccinium parvifolium*.—B. B. Higgins.

926. JAGGER, IVAN C. Bacterial leafspot disease of celery. Jour. Agric. Res. 21: 185-188. Pl. 46-47. 1921.—The disease is practically confined to leaf blades of celery [*Aptium graveolens*] and is known from New York and Michigan. The lesions are distinguishable from those of *Septoria* leaf blight only by the absence of pycnidia. The cause of the disease is *Pseudomonas apii* n. sp., group number 211. 2322033. Cultural and other biological characters are presented in condensed form.—Field experiments show that the disease may be controlled by suitable applications of Bordeaux mixture, 1 per cent, but that lime-sulphur solution, 1:25, is not effective.—D. Reddick.

927. LEHMAN, S. G. Soft rot of pepper fruits. *Phytopathology* 11: 85-87. 1921.—A hitherto unknown rot of sweet pepper (*Capsicum annuum* var. *grossum*) fruit is described. It appears first as a small water-soaked spot at the blossom end. The infected area enlarges rapidly, becomes lighter in color and soft, and after a period of 4 or 5 days involves the entire fruit. The causal organism is a phycomycete which seems to be identical with *Pythium de Baryanum*.—B. B. Higgins.

928. MCKAY, M. B. Blossom-end rot of tomatoes. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 185-186. *Fig. 52*. 1921.—The relation of the disease to water supply, and suggestions for its control are given.—E. J. Kraus.

929. MCKAY, M. B. Mosaic disease of tomatoes. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 179-184. *Pl. 14, fig. 51-52*. 1921.—Effects of the disease on foliage and fruit are described. General discussion, notes on occurrence in Oregon, and suggestions for control are presented.—E. J. Kraus.

930. MCKAY, M. B. Western yellow tomato blight. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 174-178. *Fig. 50*. 1921.—Both *Fusarium* and *Rhizoctonia* appear to be associated with the disease, though the former seems to be the more common and important. There are no resistant varieties, but such are being sought. Occurrence and means for decreasing losses are discussed.—E. J. Kraus.

931. MILES, L. E. The mosaic disease of sugar cane in Mississippi in 1920. *Mississippi Agric. Exp. Sta. Bull.* 191. 12 p., 1 fig. 1920.—A brief history of the disease is given, its symptoms, and distribution over the state; quarantine and control measures are also mentioned.—H. B. Brown.

932. NEAL, D. C. Diseases of the sweet potato in Mississippi and their control. *Mississippi Agric. Exp. Sta. Bull.* 190. 16 p., 12 fig. 1920.—In an illustrated popular bulletin, the author discusses the economic importance of the most common sweet potato diseases, their symptoms, causes, control measures, and distribution over the state. A short bibliography is appended.—H. B. Brown.

933. PRITCHARD, F. J., AND W. S. PORTE. Collar-rot of tomato. *Jour. Agric. Res.* 21: 179-184. *Pl. 41-45*. 1921.—This disease of tomato (*Lycopersicum*) takes the form of a rotting and girdling of the stem of young plants at the surface of the soil. It is essentially a disease of the seed-bed and occurs in Maryland, New Jersey and Delaware. The disease is caused by *Verticillium lycopersici* n. sp.; a technical description is presented.—Infection experiments were made with this fungus in comparison with *Macrosporium solani* and *Rhizoctonia solani*. All 3 organisms produce a girdling of stems of seedling tomatoes when applied to the uninjured stems or when mixed with the potting soil. *R. solani* often fails to infect and the lesions are superficial. Trials with potato (*Solanum tuberosum*) and with horse nettle (*S. carolinense*) show that these plants are also hosts for the 3 organisms with typical collar rot development, but, as with tomato, *Rhizoctonia solani* is weakly parasitic.—D. Reddick.

934. RAMÍREZ, RAMÓN. Enfermedad en los naranjos de Turicato, Michoacan. [An orange disease in Turicato, Michoacan.] *Rev. Agric. [Mexico]* 5: 547. 1 fig. 1920.—A rot of oranges due to *Penicillium* sp., *Aspergillus* sp. and other molds following initial injury by insects is described.—John A. Stevenson.

935. RAMÍREZ, RAMÓN. Enfermedad de los pinos de Guadalajara. [A pine disease in Guadalajara.] *Rev. Agric. [Mexico]* 5: 601. 1 fig. 1920.—A disease of the twigs of *Pinus* sp. due to *Schizotrichum* sp. is described briefly.—John A. Stevenson.

936. RITZEMA BOS, J. Myn proefveldje by het Instituut voor Phytopathologie van 1906 tot 1920. [My experiment field at the Phytopathological Institute during the period 1906-1920.] *Tijdschr. Plantenz.* 27: 29-44. 1921.—In this work the results obtained upon various phy-

topathological subjects are summarized: (1) Recovery of diseased plants after transplanting to the experiment field; (2) soil sickness; (3) production of sclerotia of *Claviceps purpurea* in large quantities; (4) ergot of rye in relation to grasses; (5) use of chemicals as fungicides and insecticides; (6) control of celery leaf spot (*Septoria apii*) with Bordeaux mixture.—*D. Atanasoff.*

937. ROSEN, H. R. Further observations on a bacterial root and stalk rot of field corn. *Phytopathology* 11: 74-79. *Fig. 1-4.* 1921.—In continuing work formerly reported [see *Bot. Absts.* 3, Entry 2742] field observations and inoculations have shown that 17 varieties of field corn and 1 of sweet corn are susceptible to this disease. The latter is characterized by localized rotting of the roots and lower nodes of the stalk, and by spots on the blades, sheaths, and husks. The organism has been obtained in 15 isolations from the various types of lesions; and similar lesions have been reproduced by inoculations with pure cultures of the organism, which is as yet unnamed.—*B. B. Higgins.*

938. SCHULTZ, E. S., AND DONALD FOLSOM. Leafroll, net-necrosis, and spindling-sprout of the Irish potato. *Jour. Agric. Res.* 21: 47-80. *Pl. 1-12.* 1921.—The symptoms, geographical distribution, and economic importance of leafroll are briefly discussed. The disease is found to be consistently carried over winter in the tubers. It can be transmitted by means of grafts, using either parts of diseased tubers or scions from diseased plants. The plants show leafroll symptoms about 1 month after inoculation as well as in their progeny. Observations made in the field and in the greenhouse indicate that aphids are agents of transmission. Experiments with caged plants in the field and in the greenhouse show that aphids are able to transmit leafroll. Two tuber units were inoculated in the field with *Myzus persicae*, both developing symptoms of leafroll, and showing leafroll in a large percentage of their progeny. Eight plants were inoculated with aphids in the greenhouse and all developed leafroll, while checks grown from the same tubers remained healthy even though some of them were fed upon by non-virulent aphids. An experiment on overwintering in the soil gave negative results. Tubers showing net-necrosis almost invariably produce leafroll plants, although leafroll plants only occasionally produce net-necrosis tubers. Net-necrosis often fails to appear in the progeny of tubers affected with it. The development of net-necrosis by leafroll tubers seems to depend on the variety, time of infection, and other factors not now understood. Net-necrosis is one of the causes of spindling sprout. Experiments with roguing indicate that this method of control will be effective in northeastern Maine under proper conditions. Leafroll appears to spread less readily than mosaic.—*K. H. Fernow.*

939. STEVENS, F. L. Foot-rot of wheat. *Science* 51: 517-518. 1920.—From evidence gathered from a study of the foot-rot disease the author presents the following facts as fully established. The fungus was isolated from lesions in practically every one of several hundred attempts, and no other species of fungus or other parasite was constantly present. The lesions were always penetrated and occupied by a fungus mycelium that agrees in general character with the fungus in question, and the diseased stems, when placed in humid surroundings, became covered with spores of the fungus. The fungus when inoculated from pure cultures as spores, mycelium, or infected wheat tissue produced disease indistinguishable from foot-rot. Wheat planted in soil with an inoculum of this fungus developed typical foot-rot. The fungus in question is a typical *Helminthosporium*. This foot-rot found in Illinois should be recognized as a disease quite distinct from all others of similar type that have been previously described. It is clearly soil-borne and probably also seed-borne.—*A. H. Chivers.*

940. TAUBENHAUS, J. J. A study of the black and the yellow mold of ear corn. *Texas Agric. Exp. Sta. Bull.* 270. 38 p., 10 fig. 1920.—The annual loss in Texas from black and yellow molds, *Aspergillus niger* and *A. flavus*, is estimated at 5,718,333 bushels. The same molds attack broom corn and stored onions. The black mold is the more destructive to corn.—Tests indicated that while *Aspergillus niger* is found on peanuts, cotton bolls, cowpeas, onions, pomegranates, Irish potatoes, squashes, broom corn, and ear corn, physiological species do

not exist. *Aspergillus niger* can invade the ear only during the milky stage and when it has been injured by the ear worm. Tests show that infected ears should not be used as seed stock.—L. Pace.

941. THOMPSTONE, E., AND A. M. SAWYER. Report on the work of the Botanical Section, Northern Circle. Ann. Rept. Agric. Sta., Agric. Chem., Agric. Eng., Bot. Northern Circle, and Asst. Entomol. Burma 1918-1919: 93-95. 1920.—Progress is reported in investigation of a destructive sclerotial disease of *Phaseolus lunatus* [see Bot. Absts. 9, Entry 917]; cotton breeding; and other experimental work.—Winfield Dudgeon.

942. WALKER, J. C. Onion smudge. Jour. Agric. Res. 20: 685-721. Pl. 80-85. 1921.—Smudge occurs only on the scales and neck of the bulb of *Allium cepa*. The causal organism is *Colletotrichum circinans* (Berk.) Voglino, heretofore generally known as *Vermicularia circinans* Berkeley. The fungus is pathogenic upon the scales of mature bulbs, but does not attack actively growing parts of the plant with the exception of young seedlings, upon which it sometimes produces "damping off." The fungus overwinters as stromata in infected scales. Conidia are sensitive to desiccation except when remaining in waxy masses on the host; in this latter condition a small percentage remain viable for a considerable period. Abundant rainfall, together with a mean soil-temperature range between 20 and 30°C., favor the rapid development of the disease in the field; hot dry weather in midsummer checks its development. Artificial drying of "sets" immediately following harvest also checks the disease but is not as yet recommended as a general practice.—H. W. Dye.

943. WALKER, J. C. Rust of onion followed by a secondary parasite. Phytopathology 11: 87-90. Fig. 1-2. 1921.—A species of *Botrytis* has been found attacking the leaves and seed stems of the top onion (*Allium cepa* var. *bulbellifera*). It enters the host plant always through lesions produced by a rust, apparently *Puccinia asparagi*.—The identity of the *Botrytis* has not yet been determined.—B. B. Higgins.

944. WEIR, JAMES R. Polyporus dryadeus (Pers.) Fr. on conifers in the Northwest. Phytopathology 11: 99. 1921.

945. ZELLER, S. M. A Cytospora canker of apple and another "die-back" fungus of interest. [Abstract.] Phytopathology 11: 105. 1921.

946. ZELLER, S. M. A spur blight of pear caused by Botrytis. [Abstract.] Phytopathology 11: 105. 1921.

947. ZELLER, S. M. Heart-rot of prune and peach in Oregon. [Abstract.] Phytopathology 11: 105. 1921.—In western Oregon the greater percentage of heart-rot in peach (*Amygdalus persica*) and prune (*Prunus domestica*) trees is due to *Trametes carnea*. *Lenzites sepiaria* and *Fomes pinicola* also cause some heart-rot in these trees.—B. B. Higgins.

948. ZELLER, S. M. Wood decay in orchard trees in Oregon. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 132-138. Fig. 35-37. 1921.—The organisms causing most serious decay of cherry wood are *Irpez lacteus*, *Polystictus versicolor*, and *P. hirsutus*; of apple and pear wood *P. versicolor*; and of prune wood *Trametes carnea*, *Lenzites sepiaria*, *Fomes pinicola*, *Stereum hirsutum*, and others. Of trees having large pruning wounds a survey showed 97 per cent to be decayed. Painting of the wounds with Bordeaux paste, and about the edges with a mixture of asphalt and paraffin, is recommended. Copper nails or tacks driven into the wound will supplement the antiseptic action of the Bordeaux paste.—E. J. Kraus.

ERADICATION AND CONTROL MEASURES

949. BARSS, H. P. Cylindrosporium leaf-spot of prune and cherry. Oregon. Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 156-158. Fig. 42-43. 1921.—Control is effected by spray-

ing with Bordeaux mixture (4-4-50) on May 1 and at intervals of 3 or 4 weeks thereafter until dry weather is permanently established.—*E. J. Kraus.*

950. BARSS, H. P. Grain smuts and their control. Oregon. Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 197-202. *Fig. 60-63.* 1921.—General description and methods of control are given.—*E. J. Kraus.*

951. BARSS, H. P. Onion smut control. Oregon. Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 187-191. *Fig. 54-55.* 1921.—Experiments with, and recommendations concerning, the use of formaldehyde during seeding are given.—*E. J. Kraus.*

952. BARSS, H. P. Peach leaf-curl control. Oregon. Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 145-151. *Pl. 12-13.* 1921.—Notes are given on comparative effectiveness of several sprays containing copper, sulphur, or coal tar derivatives, and the time of application of spray. Thorough spraying with Bordeaux mixture (6-6-50) any time between December 1 and the first part of February resulted in almost perfect control.—*E. J. Kraus.*

953. BARSS, H. P., AND W. A. SMART. Notes on tests with fungicides. Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept. 3: 167-171. *Fig. 48.* 1921.—The discussion relates to (1) preliminary tests with late summer sprays for apple-tree anthracnose, (2) sugar as a stabilizer for Bordeaux mixture, (3) iron sulphide, an effective aid to thoroughness in spraying, (4) dry-lime-sulphur vs. ordinary liquid lime-sulphur. Experimental data are briefly presented.—*E. J. Kraus.*

954. BROCK, W. S., AND W. A. RUTH. Judging a spray by its chemical content. Proc. Amer. Soc. Hort. Sci. 17: 105-106. 1920 [1921].—The authors point out that a spray material should not be judged solely by its chemical content as such important properties as solubility, rate of decomposition, adhesiveness, absorption of components of the spray or its decomposition products, the effect of light, heat, and moisture upon the material and upon the relation of the material to the plant and to the fungus to be controlled may be ignored. Although the Sherwin-Williams Company recommends a dilution for their dry lime-sulphur which yields a spray containing less sulphur than is present in a liquid lime-sulphur generally accepted as controlling apple fungi and San José scale, the recommended concentration has been found successful in Illinois during 5 years for controlling apple fungi and in 2 localities for 2 years in controlling San José scale. For dependable results repeated field trials in the immediate vicinity seem to be necessary.—*H. W. Richey.*

955. GESCHWIND. Die in den Schwarzkiefernsaatkämpfen des Karstes auftretenden schädlichen Insekten und Pilze sowie die Mittel zu ihrer Abwehr. [Insects and fungi in the Austrian pine nurseries of the Karst region and the means of combating them.] Wiener Allg. Forst- u. Jagd Zeitg. 39: 29-30. 1920.—The chief insect enemies of Austrian pine (*Pinus austriaca*) in the nurseries of the Karst region on the east Adriatic coast are discussed as well as the needle cast disease (*Lophodermium pinastri*) and the root decay caused by *Fusoma parasiticum* (*Fusarium blasticola*). There are well known ways of combating all of these pests but the author considers only the effect of laying sods, grass side down, between the drills in the seed beds. The system of laying these sods was developed primarily as a means of protection against high winds and drying effects and also as a means of adding humus to the soil. The method has proved of considerable help in checking insect attack. The activity of the root-decaying fungus seems to depend upon air stagnation. The sods allow a much greater circulation of air over the seed beds than when they are protected from drying out by lattice frames or leafy branches spread over the beds.—*F. S. Baker.*

956. HOLMES, E. M. The silver-leaf disease fungus. Pharm. Jour. 106: 31-32. 1921.—*Stereum purpureum*, proved by PERCIVAL to be the cause of the silver-leaf disease of the plum tree and the Portugal laurel, is described by the author, and directions are given for collecting and burning the fungus, which matures during the late winter and early spring.

The fungus spores attack the trees where the bark is cracked and where gum often exudes from wounds. Probably the best way to prevent attack is to apply pine tar to every crack or abrasion of the bark. It is also suggested that an antiseptic resin, such as a combination of formaldehyde with a resinous base, might be devised as a more sightly remedy.—*E. N. Gathercoal.*

957. MACKIE, W. W., AND F. N. BRIGGS. Fungicidal dusts for control of smuts. *Science* 52: 540. 1920.—It has been demonstrated recently that the commonly accepted standard smut treatments with either copper sulphate or formaldehyde are frequently injurious, either producing poor germination or weakening the seedling. Formaldehyde injury seems more severe with wheat when plantings are made in dry soil. Injury from copper sulphate treatments are greater with wheat mechanically injured, as in the threshing process. As an improved method, dust applications of copper sulphate are recommended. Little Club wheat was dusted with spores of *Tilletia tritici* at the rate of 1 part smut spores to 750 parts of seed by weight, and treated by standard formulas as well as by the dust method. Dehydrated copper sulphate mixed with equal parts of calcium hydrate, at the rate of 2 ounces per bushel, controlled smut without injury to germination.—*A. H. Chivers.*

958. OWENS, C. E. Gooseberry mildew control. *Oregon Agric. Exp. Sta. Crop Pest and Hort. Rept.* 3: 152-155. *Fig. 39-41.* 1921.—Complete control may be obtained by 3 applications of lime-sulphur spray. The 1st of these at a dilution of 1-25, put on when the leaves are emerging from the buds, is most important; the 2nd (1-45) should be put on just before blooming, the 3rd (1-50) just after blooming.—*E. J. Kraus.*

959. SCOFIELD, C. S. Cotton root rot in the San Antonio rotations. *Jour. Agric. Res.* 21³: 117-125. 1921.—Records are presented covering 8 years on the occurrence of root rot of cotton [caused by *Phymatochitrium omnivorum*] in experimental plots in Texas involving continuous cropping and rotations with various crops of 2, 3, and 4 years respectively. The data indicate that "the control of root rot is not to be found through any ordinary system of crop rotation or of tillage methods."—*D. Reddick.*

960. SNAPP, OLIVER I., AND LESLIE PIERCE. Experiments in dusting and spraying peaches for the control of curculio, brown rot, and scab. *Mississippi Agric. Exp. Sta. Bull.* 195. *Sp., 1 fig.* 1920.—Liquid sprays gave slightly better results than dust but required more labor in applying. Dust (lead arsenate 10 per cent, lime 10 per cent, and sulphur 80 per cent) applied on April 22, May 11, and June 12 controlled brown rot and scab effectively but did not control the curculio, as 19.8 per cent of the fruit produced was wormy.—*H. B. Brown.*

961. ZUNDEL, GEORGE L. Preliminary experiments on injury to wheat from seed treatment in Washington. [Abstract.] *Phytopathology* 11: 103. 1921.—Both copper sulphate solution (1 pound to 5 gallons) and formaldehyde solution (1 to 40) injured seed wheat. The injury was greatly reduced when such treatment was followed by dipping the seed 3-5 minutes in lime solution.—*B. B. Higgins.*

MISCELLANEOUS (TECHNIQUE, COGNATE RESEARCHES)

962. G., C. G. [Rev. of: CHITTENDEN, F. J. *The garden doctor: plants in health and disease.* x + 154 p. *Country Life: London; Chas. Scribner's Sons: New York, 1920.*] *Nature* 107: 40. 1921.

963. HESLER, L. R. [Rev. of: SMITH, ERWIN F. *An introduction to bacterial diseases of plants.* xxx + 688 p., 453 fig. *W. B. Saunders Co.: Philadelphia and London, 1920.*] *Phytopathology* 11: 107-108. 1921.

964. ORTON, C. R. Lightning injury to potato and cabbage. *Phytopathology* 11: 96-98. *Fig. 1.* 1921.

965. RATHBUN, ANNIE E. Methods of direct inoculation with damping-off fungi. *Phytopathology* 11: 80-83. *Fig. 1-3*. 1921.—In order to overcome some of the uncertainties encountered in testing the susceptibility of plants to damping-off fungi by placing the organism in the soil, methods of direct inoculation have been devised. By these methods the organism, growing on culture media, is brought into direct contact with the stem, root, or whatever part of the plant seems most desirable for the test.—*B. B. Higgins*.

PHARMACOGNOSY AND PHARMACEUTICAL BOTANY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 633, 658, 661, 664, 728, 936, 956.)

966. BALME, JUAN. Cultivo de la adormidera blanca. [Poppy cultivation.] *Rev. Agric. [Mexico]* 4: 428-429. 1919.—Brief cultural directions for *Papaver somniferum candidum* are given, including methods of harvesting the product and the yields to be expected.—*John A. Stevenson*.

967. BLISS, A. R. Report on alkaloids. *Jour. Assoc. Official Agric. Chem.* 4: 416-420. 1921.—The report deals with strychnine, quinine, physostigmine, hyoscyamine, and others.—*F. M. Schertz*.

968. BUSCHMANN, E. Untersuchungen über die chemischen Bestandteile von *Bulbus Scillae*. [Chemical constituents of *Bulbus Scillae*.] *Arch. der Pharm.* 257: 79-86. 1919.

969. DEHRS, V. Contribution à l'étude du Quebracho rouge. [Contribution to the study of red quebracho.] *Bull. Sci. Pharm.* 28: 48-54. 1921.—The paper, which is an abstract of B. GALARZA's paper from the "L'Institut de Botanique et de Pharmacologie de la Faculté des Sciences Médicales de Buenos Aires," No. 32, 1915, gives a very detailed account of the collecting of the wood of red quebracho (*Schinopsis Lorenzii* and *S. Balensae*), its physical and chemical properties, and its use.—*H. Engelhardt*.

970. DEHRS, V. Étude des Aspidospermées. [Study of the aspidospermae.] *Bull. Sci. Pharm.* 28: 54-61. 1921.—A discussion of EDWIN ROTHLIN's paper, "a contribution to the study of the Aspidospermae," from the Instituto de botanica y farmacologia de Buenos Aires. It deals with the botanical, microscopical, pharmacological, and chemical studies of *Aspidosperma quebracho blanco* and *Aspidosperma peroba*.—*H. Engelhardt*.

971. DIETERLE, H. Xanthosterin, ein krystallinischer Körper aus der Rinde von *Xanthoxylum Budrunga* DC. [Xanthosterin, a crystalline body from the bark of *Xanthoxylum Budrunga*.] *Arch. der Pharm.* 257: 260-263. 1919.

972. FERENEZ, A. Ueber das Kardobenediktenkrautöl. (*Cnicus Benedictus* L.) [Oil of blessed thistle.] *Arch. der Pharm.* 257: 180-190. 1919.—The oil contains 89.80 per cent unsaturated or fluid fatty acids and 3.68 per cent saturated or solid fatty acids. Analysis of the former gave 74 per cent oleic acid and 26 per cent linoleic acid; of the latter 40 per cent stearic acid and 60 per cent palmitic acid. Specific gravity of *Cnicus Benedictus* oil (15°C.) is 0.9262, acid number 1.2, refraction index 1.47178. Other physical and chemical constants are given, and details of separation of the fatty acids.—*H. G. Barbour*.

973. FOCKE, C. Zur künftigen physiologischen Einstellung der officinellen Digitalisblätter. [Physiological testing of digitalis.] *Arch. der Pharm.* 257: 270-288. 1919.—This discussion appears to be of local interest for Germany.—*H. G. Barbour*.

974. FRIEDRICH, O. VON. Ueber einige Inhaltsstoffe der Altheewurzel. [Some constituents of *Althaea* root.] *Arch. der Pharm.* 257: 288-298. 1919.—The content in fatty oil is

1.7 per cent. The latter consists of glycerides of palmitic and oleic acids, also of butyric acid and phytosterin; probably also a high molecular oxy-acid.—The odor of the root is carried by a constituent of unknown composition, non-volatile with steam, soluble in ether but not in petroleum ether.—A lecithin, containing palmitic and oleic acids and choline, is present. The sugar is chiefly cane sugar (10.2 per cent); the invert-sugar content was 0.78 per cent. The gummy portion contains numerous polysaccharides, 64 per cent consisting of glycosan. Galactose is not present (as formerly held), but another saccharocolloid, which yields *d*-galactose on hydrolysis, is present.—*H. G. Barbour.*

975. GADAMER, J. Zur Kenntnis der Chelidonium-Alkaloide. [Chelidonium alkaloids.] Arch. der Pharm. 257: 298-303. 1919.—Studies in stereo-isomerism are presented.—*H. G. Barbour.*

976. GRANT, E. H. Report on balsams and gums. Jour. Assoc. Official Agric. Chem. 4: 421. 1921.—A method is given for the determination of crude fiber in Karaya gum.—*F. M. Schertz.*

977. GREENISH, HENRY G., AND CONSTANCE E. PEARSON. A new source of santonin. Pharm. Jour. 106: 2-3. 1921.—*Artemisia brevifolia*, found abundantly in western Thibet, at an altitude of 9,000-14,000 ft., and in northern India from Kashmir to Kumaon at a somewhat lower altitude, yields at least 1 per cent of santonin. As far as is at present known, santonin is not widely distributed in the genus *Artemisia*. Apart from *A. maritima* var. *Stechmanniana* Besser, the unexpanded flower-heads of which constitute commercial santonica and contain from 2 to 3 per cent of santonin, it has been found only in *A. gallica*.—*E. N. Gathercoal.*

978. HARRISON, C. W. The pharmacopoeial assay for alcohols in santal oil extended to include the true acetyl value. Jour. Assoc. Official Agric. Chem. 4: 425-427. 1921.—The method as submitted gives the ratio of the saponification number of the acetylated oil to the acetyl value, and when expressed as santalol furnishes a significant figure for detecting adulterations.—*F. M. Schertz.*

979. HEIDUSCHKA, A., UND K. LÜFT. Das fette Oel der Samen der Nachtkerze (*Oenothera biennis*) und über eine neue Linolensäure. [Fatty oil of evening primrose seed and a new linoleic acid.] Arch. der Pharm. 257: 33-69. 1919.—In 100 gm. of the oil of evening primrose seed the following constituents, expressed in grams, were found: γ -linoleic acid 2.21, α -linoleic acid 33.65, β -linoleic acid 26.67, oleic acid 25.77, palmitic acid and high molecular acids 5.22, caproic acid 0.78, unsaponifiable constituents 2.27. γ -linoleic acid was not previously described; its hexabrom derivative has a melting point of 195-196°C.—*H. G. Barbour.*

980. HERMANN, E. Ein neuer Giftpilz. [A new poisonous fungus.] Pharm. Zentralhalle 61: 511-513. 1920.—Two cases of poisoning could be traced to the eating of a fungus which at first was considered as *Inocybe frumentacea* or *I. sambucina* but later was determined by Romell as *I. lateraria*. The fungus is extremely poisonous, patients dying within 2 hours after previously suffering from vertigo, burning pain in the urinary tract, vomiting, and blindness. Persons who have not eaten a fatal amount of the fungus become blind, but regain eyesight within 24 hours. A detailed description of the structural characteristics of the fungus is given.—*H. Engelhardt.*

981. HOLDERMANN, R. Kirschlorbeerwasser und eine künstliche Darstellungsweise für Aq. Amygdalarum amararum. [Cherry laurel water, and an artificial preparation of water of bitter almonds.] Arch. der Pharm. 257: 69-71. 1921.

982. LUTHER, J. B. The Turner reaction for gurjun balsam. Jour. Assoc. Official Agric. Chem. 4: 422-424. 1921.—A report is presented on the Turner reaction as applied to imports of copaiba to test for the presence of gurjun balsam as an adulterant.—*F. M. Schertz.*

983. McCUTCHEON, ALEXANDER. Cascara sagrada (*Rhamnus Purshianus* DC.) grown in Scotland. Pharm. Jour. 106: 72-73. 1921.—An account is given of the growth of *Rhamnus*

Purshianus seedlings, planted some years ago in East Lothian, Scotland. The plants have not developed into trees, but retain rather the bushy habit of growth. They are now about 9 feet high. Some 2 years ago bark was peeled from a number of branches, dried, and made into the official fluid extract. The latter possessed the full therapeutic value of the best North American *Cascara sagrada*. It would be quite feasible to grow and harvest this drug in Scotland.—*E. N. Gathercoal*.

984. MCNAIR, JAMES B. A study of *Rhus diversiloba* with special reference to its toxicity. *Amer. Jour. Bot.* 8: 127-146. *Pl. 1, fig. 2.* 1921.—The author discusses the taxonomy of this species, particularly its relationship to *R. toxicodendron*, and outlines the distribution of the species.—The fresh sap emulsion secreted by the resin canals is apparently the only portion of the plant which causes poisoning of the skin (dermatitis). Those parts of the plant which do not possess canals,—the anthers, pollen, xylem, epidermis, cork cells, and trichomes,—are therefore non-toxic. The virulency of the plant in its different growth stages is discussed.—*E. W. Sinnott*.

985. MARSH, C. DWIGHT, A. B. CLAWSON, AND W. W. EGGLESTON. *Baccharis pteronioides* as a poisonous plant of the Southwest. *Jour. Amer. Vet. Med. Assoc.* 57: 430-434. *Fig. 1-2.* 1920.—Suspicion has been thrown on *Baccharis pteronioides* as a possible cause of some losses of live stock in the Southwest [U. S. A.]. Feeding experiments have shown the plant to be poisonous to sheep, and it may be presumed that it will affect cattle in a similar way. A short description of the plant is given.—*C. D. Marsh*.

986. PAMMEL, L. H. Equisetosis or horsetail poisoning. *Vet. Med.* 16: 43. 1921.—A report is made of a case of horse poisoning, with additional data, mostly from Pammel's manual.—*C. D. Marsh*.

987. PAMMEL, L. H. Some forms of lima beans poisonous. *Vet. Med.* 16: 45. 1921.—A distinction is made between lima beans, some varieties of which are poisonous, and butter beans, which are not poisonous.—*C. D. Marsh*.

988. PAMMEL, L. H. Three-flowered nightshade poisonous. *Vet. Med.* 16: 46-47. 1921.—An account is given of the fatal poisoning of 2 horses, with details of the symptoms and autopsy findings.—*C. D. Marsh*.

989. PAMMEL, L. H. Will frosted Sudan grass produce poisoning? *Amer. Jour. Vet. Med.* 15: 27. 1920.—In reply to this query the author briefly discusses the subject.—*C. D. Marsh*.

990. RAMÍREZ, ROMÁN. *Drimys mexicana* Sessé et Moc. *Rev. Agric. [Mexico]* 4: 426. 1 fig. 1919.—The cultivation of *Drimys mexicana* Sessé et Moc, the bark of which is used for medicine, is discussed.—*John A. Stevenson*.

991. SPOKES, RAY E. American styrax. *Jour. Amer. Pharm. Assoc.* 9: 1055-1060. 1920.—A study of American styrax collected in the vicinity of Atlanta. The American styrax was found to be of firmer consistency than the South American product, in this respect resembling European styrax. The author reports the following analyses:

	(a)	(b)	(c)	U. S. P. STANDARD
	per cent	per cent	per cent	
Incineration residue.....	1.4	1.4	1.4	Not more than 1 per cent
Acid value.....	35.0	39.0	37.0	Not more than 86 Not less than 56
Undissolved residue.....	3.0	3.5	3.6	Not more than 2.5 per cent
Cinnamic acid (free).....	12.07	13.84	13.75	Saponification value
Resin esters.....	34.1	35.5		Not more than 230
Styrol.....	1.1	1.6		Not less than 170

The author was unable to isolate styresinol in a seemingly pure state. The volatile oil (1.5-2.0 per cent) obtained by steam distillation has been identified as styrol, $C_6H_5CH:CH_2$, a phenyl substitution product of ethylene and identical to that obtained from Oriental species; it has a boiling point of $145^\circ C.$, sp. gr. of 0.070, and is dextrorotatory $16^\circ 30'$. The author was unable to isolate styrogenin, a white amorphous body, reported to be present in styrax. Methods of collection and range of distribution are given, the latter according to the author extending from Connecticut to southeastern Missouri, south to Tampa Bay, Florida, through Arkansas and Oklahoma to Texas, and then south to Mexico. It is stated that the outlook for larger use of American styrax seems encouraging.—*Anton Hogstad Jr.*

992. VIEHOEVER, ARNO. Report on medicinal plants. Jour. Assoc. Official Agric. Chem. 4: 409-415. 1921.—The report concerns itself with new sources of supplies or proper substitutes for drugs not now obtainable; value of volume-weight determinations in the analysis of crude drugs and spices; value of micro-sublimation in the analysis of plant products; the condition of domestic and imported drugs.—*F. M. Schertz.*

993. WALLIS, T. E. Analytical microscopy. Pharm. Jour. 106: 48-50. Fig. 1. 1921.—The concluding paper of this series presents counting methods, illustrated by the *Lycopodium* spores and the maize starch procedure, and the preparation of crude fiber for counting.—*E. N. Gathercoal.*

994. WINTERSTEIN, E., UND A. WEINHAGEN. Beiträge zur Kenntnis der Arekaalkaloide: Ueber Guvacin und Isoguvacin. [Areca alkaloids: Guvacin and isoguvacin. Arch. der Pharm. 257: 1-12. 1919.—Chemical isolation of two isomeric bases, $C_8H_9NO_2$, guvacin and isoguvacin, from the strongly concentrated mother liquid of arecolin. Guvacin is said to be Δ^3 tetrahydronicotinic acid. Isoguvacin is possibly a pyrrol derivative.—*H. G. Barbour.*

995. ZÖRNIG-BASEL, H. Beiträge zur Pharmakogeographie. [Pharmaco-geography.] Arch. der Pharm. 257: 129-144. 1919.—An extensive catalogue of commercial products of African and neighboring colonies is presented. Political ownership of these colonies seems to be based on the status in 1913.—*H. G. Barbour.*

PHYSIOLOGY

B. M. DUGGAR, *Editor*

CARROLL W. DODGE, *Assistant Editor*

(See also in this issue Entries 599, 610, 634, 686, 694, 700, 794, 801, 815, 817, 824, 866, 871, 872, 883, 908, 909, 911, 919, 928, 964, 974, 975, 1068, 1071)

DIFFUSION, PERMEABILITY, ADSORPTION

996. FITTING, HANS. Untersuchungen über die Aufnahme und über anomale osmotische Koeffizienten von Glyzerin und Harnstoff. [Investigations relative to the absorption and the abnormal osmotic coefficients of glycerine and urea.] Jahrb. Wiss. Bot. 59: 1-170. 1919.

997. KNUDSON, L., AND S. GINSBURG. Suggestions with respect to the measurement of osmotic pressure. Amer. Jour. Bot. 8: 164-170. Fig. 1. 1921.—The osmotic concentration of the leaf cells of *Zebrina pendula* and *Iresine Herbstii* was determined both by the cryoscopic and the plasmolytic methods. A piston cylinder for the expression of the cell sap is described. The experiment shows that a pressure of 50,000 lbs. yields a more concentrated sap than does one of 10,000 lbs. The method of freezing the tissue was not found to affect the results greatly. Considerable differences were observed in the osmotic pressure when determined by the plasmolytic and by the cryoscopic methods, the latter giving in every case a higher figure.—*E. W. Sinnott.*

998. KOLKWITZ, R. Die künstliche Zelle. [An artificial cell.] Ber. Deutsch. Bot. Ges. 38: 136-140. Fig. 1. 1920.—The author describes the construction of a new device by which water absorption by osmosis, artificial turgor pressure, and secretion of water as the result of high turgescence may be easily demonstrated. The apparatus consists of (a) a portion which is similar in form to the expanded part of a thistle tube and of about 100 cc. capacity, (b) a glass stopcock, and (c) an approximately cylindrical portion of about 5 cc. capacity into which a tube with an internal diameter of several mm. may be fixed by means of a stopper. The 3 parts of the apparatus are of glass and made in 1 piece. The stopcock connects the narrower end of member "a" with "c," and is so bored that by proper adjustment the chamber of "a" may be made to communicate with the chamber of "c." Either "a" or "c" may be placed in communication with the atmosphere, or the entrance to both chambers may be closed. An animal membrane is stretched across the large open end of "a," and in the demonstration of water secretion the open end of "c" is closed with parchment paper or some vegetable membrane. Directions for the use of the apparatus are given.—R. M. Holman.

999. RUDOLFS, W. Effect of salt solutions having definite osmotic concentration upon absorption by seeds. Soil Sci. 11: 277-293. 2 fig. 1921.—The influence of single salt solutions, varying from 0.001 to 7.0 atmospheres, of calcium nitrate, potassium carbonate, magnesium sulphate, potassium dihydrogen phosphate, sodium chloride, potassium chloride, and sodium nitrate upon water absorption by seeds was determined. Seeds of wheat, corn, watermelon, buckwheat, Canada field pea, white lupine, soybeans, rape, and alfalfa were used. There is a marked difference in the absorbing power of seeds of different species. The highest rates were found in alfalfa, the lowest in corn. Average absorption rates show a linear relation to the osmotic concentration of the solutions, decreasing with increase in concentration, except in dilute solutions. The retardation of absorption is accomplished by osmotic action. Low concentrations have a stimulating effect upon the absorption of some seeds but not upon that of others.—W. J. Robbins.

MINERAL NUTRIENTS

1000. HAENSELER, C. M. The effect of salt proportions and concentration on the growth of *Aspergillus niger*. Amer. Jour. Bot. 8: 147-163. Fig. 6. 1921.—*Aspergillus niger* was grown on 3-salt solutions of 3 different total concentrations (0.5, 2.1, and 4.2 atmospheres) and in the presence of sugar. For each total concentration, all possible combinations obtainable by varying the partial concentration of each salt by increments of $\frac{1}{10}$ of the total concentration were made. In certain cases the salts were kept constant and the concentration of the sugar was changed. When the salt proportions were the same, an increase in total concentration gave an increase in the yield of the fungus (dry weight). The partial concentrations of KH_2PO_4 and MgSO_4 were varied within wide limits without in any way affecting the yields. Yield is approximately proportional to the amount of NO_3 present, whether this amount is the result of changes in total or partial concentration. Beyond a certain point, the concentration of sugar is the limiting factor in growth. When salt concentrations and proportions are constant, yield is nearly proportional to the sugar concentration of the nutrient solution.—E. W. Sinnott.

1001. MITCHELL, J. H. Report on inorganic plant constituents. Jour. Assoc. Official Agric. Chem. 4: 391-394. 1921.—Methods are reported for determining calcium, magnesium, and manganese in the presence of large amounts of phosphorus. The method is adapted for use with certain seeds, cereals, and legumes.—F. M. Schertz.

1002. TRUE, RODNEY H. The function of calcium in the nutrition of seedlings. Jour. Amer. Soc. Agron. 13: 91-107. 1921.—The results were obtained by growing seedlings in laboratory cultures. Pure water represents a partial ionic vacuum to roots of plants and tends to establish an equilibrium with the cell contents by the withdrawal of ions from the plant. Injurious action results and is not fully overcome by any pair of ions (salt) tested, but is very

largely overcome by salts yielding the Ca^{++} ion, to a much less degree by those yielding the Mg^{++} ion, and very slightly or not at all by those yielding the K^+ or Na^+ ions. The calcium salts absorbed most abundantly are CaCl_2 , CaCO_3 , and $\text{Ca}(\text{NO}_3)_2$. Absorption of electrolytes is increased by an increase in the number of kinds of nutrient ions present in the solution. When accompanied by Ca^{++} ions, the K^+ ions—neglected when offered in simple solutions—are absorbed. As the variety of ions present in the solution is increased, the importance of rather sharply marked proportional relations becomes distinctly less than in the simpler solutions. The most striking single chemical condition of the solution is the presence of a certain minimal quantity of Ca^{++} ions. A certain minimal quantity of Ca^{++} ions seems to be necessary to secure the normal absorption of the other required ions present in the soil solution. Ca ions evidently make "physiologically available" the other nutrient materials contained in the soil solution. The basis, then, for an understanding of special service performed by the Ca^{++} ion is doubtless to be sought in the physiology of the cell.—*F. M. Schertz.*

PHOTOSYNTHESIS

1003. STERN, KURT. Untersuchungen über Fluorescenz und Zustand des Chlorophylls in lebenden Zellen. [The fluorescence of chlorophyll, and its condition in living cells.] Ber. Deutsch. Bot. Ges. 38: 28-35. 1920.—By means of the spectroscope the author has studied the fluorescence of living cells of *Chlorella* suspended in water and of solutions of chlorophyll in various lipoids. Since fluorescence was observed in the suspension of living cells and in the solutions in lipoids, but never in the colloidal solutions in water, even when various substances were added which might be conceived of as rendering chlorophyll in colloidal solution in the chloroplast fluorescent, he concludes that in the intact green cell the chlorophyll is in true solution in a lipid. He states further that the process of assimilation of carbon dioxide goes on partly in a lipid, partly in a hydroid phase. Surface active substances alter the bounding surfaces of both phases and thus hinder or stop assimilation.—*R. M. Holman.*

1004. WEBER, FRIEDL. Notiz zur Kohlensäureassimilation von *Neottia*. [Carbonic acid assimilation by *Neottia*.] Ber. Deutsch. Bot. Ges. 38: 233-242. 1920.—The author reviews the literature relating to the ability of the brown, also chlorophyll-containing, chromatophores in the cells of the inflorescence of the saprophytic orchid, *Neottia nidus avis*, to assimilate carbon dioxide. Interest in the question has been renewed since WILSCHKE's discovery that the green pigment in question contains only *a*-chlorophyll and none of the *b*-component of ordinary chlorophyll. The negative results of WILLSTÄTTER and STOLL are not considered conclusive by the author of the present paper.—The author found that the starch, which has long been known to be present in the cells of the brown inflorescence, does not disappear when the shoots are kept in the dark for many days; and that plants which have not been exposed to light at any time during their development, although strikingly etiolated and without either chlorophyll or the characteristic brown coloration, are nevertheless rich in starch. *Neottia* chromatophores are without that ability to reduce silver salts in darkness which MOLISCH found in the chloroplasts of all the phanerogams which he investigated, though weak in the case of green orchids and absent in certain diatoms and in *Hydrurus*. These 2 last mentioned groups, according to Wilschke, lack the chlorophyll component *b*. The author's attempts to determine by Engelmann's bacterial method whether oxygen was liberated by illuminated tissue containing chromatophores were not successful. Positive results were secured by the use of reduced indigo carmine solution, but the author believes the question not yet conclusively answered.—*R. M. Holman.*

1005. WILLSTÄTTER, RICHARD, UND ARTHUR STOLL. Untersuchungen über die Assimilation der Kohlensäure. [Investigations of the assimilation of carbon dioxide.] 448 p. Julius Springer: Berlin, 1918.—A collection of seven papers: I. The constant chlorophyll-content during photosynthesis. The chlorophyll content of leaves is 0.15 - 0.35 gm. per 100 gm. fresh weight; 0.6 - 1.2 gm. per 100 gm. dry weight, and 0.3 - 0.7 gm. per sq. m. leaf surface. The carotinoids are 0.07 - 0.20 per cent of the dry weight, or 0.03 - 0.07 gm. per sq. m. Normal plants show a constant relation between the chlorophyll components *a* and *b*, designated

$Q \frac{a}{b}$ equal to an average of $2.9 \pm 0.5 - 0.6$. Under natural conditions this relation is not disturbed during photosynthesis. The relation of the 2 carotinoids, $Q \frac{c}{x} = 0.60 \pm 0.1$, also shows but slight variation during photosynthesis. Detailed directions are given for the analytical determination of the chlorophyll components. The quotient $\frac{\text{chlorophyll}}{\text{carotinoid}} = Q \frac{a+b}{c+x}$ varies greatly in different leaves and during the year. In autumn the chlorophyll components decrease while the carotinoids remain, $Q \frac{c}{x}$ varies irregularly, but $Q \frac{a}{b}$ remains about constant.

After long continued photosynthesis, 22 - 67 hours, $Q \frac{a}{b}$ and $Q \frac{a+b}{c+x}$ were but very slightly changed, while $Q \frac{c}{x}$ was shifted in favor of the xanthophyll. An increase in the rate of respiration by raising the temperature to 30 - 37°C. had no effect on $Q \frac{a}{b}$ and $Q \frac{c}{x}$. Photosynthesis at 37 - 45°C. had no effect on the chlorophyll content, but $Q \frac{a}{b}$ was lowered. During

very active photosynthesis, that is, at 30 - 32°C., 5 per cent CO_2 , and light more intense than sunlight, after 6 hours no change in the chlorophyll content was observed.—II. *The relation between photosynthetic activity and the chlorophyll content of leaves.* The complex apparatus and methods used are described, based upon differential determination of CO_2 absorbed in KOH bulbs and weighed. Cut leaves were used and a metal filament electric lamp as the source of the light. "Assimilationszahl" is taken as a measure of photosynthesis and defined as grams of CO_2 fixed per hour per gram of chlorophyll. This varies with the species and with age of leaf used. For 1 molecule of chlorophyll old autumnal leaves of *Ampelopsis quinquefolia* fixed 18 molecules CO_2 and young autumnal leaves of the same plant 164 molecules; in the summer, leaves of *Sambucus nigra* fixed 135 molecules CO_2 , *Sambucus nigra* var. *aurea* 2463; etiolated leaves of *Phaseolus vulgaris* fixed 2736 molecules CO_2 . Experiments with leaves in early spring indicate that the development of pigments and of the photosynthetic machine are not parallel and it is concluded that photosynthesis is dependent not only upon chlorophyll but also upon an internal factor which precedes chlorophyll in the development of the leaf. When yellow autumnal leaves are brought under experimental conditions of maximal photosynthesis (25°C., 5 per cent CO_2 , 48,000 M. C. S.) their activity on the basis of chlorophyll content is about the same as the normal leaf, for the activity of the internal factor has been reduced to about the same extent as the chlorophyll content. The "Assimilationszahl" of the skins of fruits is about the same as that of leaves. The absolute value of the photosynthetic rate is about the same for normal leaves and leaves of varieties poor in chlorophyll, and in the case of *Ulmus*, on the basis of leaf area, the leaves low in chlorophyll have the highest rates. With advancing season chlorophyll content increases while rate of photosynthesis decreases. In the yellow varieties the carotinoids are not higher in actual amount but only in proportion to the chlorophyll. That these yellow pigments play no direct rôle in photosynthesis is shown by the fact that when the violet rays, which are absorbed only by the carotinoids, are removed by means of a potassium bichromate filter, no reduction in the rate was observed. By filtering the light through 1 leaf of *Cucurbita pepo*, the photosynthetic rate of the same species was reduced to 1/20 of that without the filter, and filtered through 2 leaves the rate was zero. A comparative study of etiolated and normal leaves showed remarkably high photosynthesis rates for the former. Etiolated leaves exposed to the light 6-48 hours showed rates which in absolute values were higher than those of normal leaves. Etiolated leaves which had developed but 3-6 per cent of the normal chlorophyll content were able to fix completely their respiration CO_2 . Chlorotic leaves exhibit a very weak photosynthetic activity. Anthocyanin seems to be without influence on photosynthesis. The parasite *Neottia nidus avis* was found to contain chlorophyll, but even at 30°C. and with 5 per cent CO_2 it carried on no photosynthesis. A comparative study, with leaves rich and poor in chlorophyll, of the effects of variations in temperature and light intensity revealed a decided disproportionality between chlorophyll content and photosynthetic

activity and led to the conclusion that in this process there are 2 variable factors: (a) the green pigment, and (b) a factor associated with the protoplasmic activity. The temperature coefficient depends upon the nature of the leaf and is probably variable for different species. Leaves poor in chlorophyll are more dependent upon variations in the light intensity while those rich in chlorophyll show greater variations with temperature.—III. *The absorption of carbon dioxide by the unilluminated leaf.* Leaves absorb CO_2 from a 10 per cent gas mixture. The absorption is independent of the pigment content. The leaf substance absorbs more CO_2 than the water in the leaf. The difference between the absorption by water and by the leaf substance is greater with decreasing partial pressure of CO_2 . Leaves which have been killed and dried and then moistened again absorb CO_2 as do living leaves. The old statement that lecithin absorbs large quantities of CO_2 was found to be entirely erroneous.—IV. *The behavior of chlorophyll toward carbon dioxide.* Chlorophyll in organic solvents does not react with CO_2 , but in colloidal aqueous solutions reaction takes place. CO_2 is absorbed and given off again when the partial pressure of the CO_2 is reduced. It is suggested that there is formed a combination of chlorophyll with performic acid or formaldehydeperoxide which then splits off O_2 . The absorption spectra of colloidal solutions of chlorophyll and of leaves are very similar. At 0°C . the addition of CO_2 to chlorophyll is most effective and decomposition into phaeophytin and MgCO_3 is lower. The aqueous colloidal solutions were allowed to absorb CO_2 and the amounts thus absorbed were determined by (a) passing CO_2 -free air through the solution and determining the CO_2 liberated, (b) taking up in ether and determining the Mg content, (c) adding alcohol to make an 80 per cent solution and drawing off the gas. Each method shows that the CO_2 produces a certain amount of decomposition of chlorophyll. The decomposition of aqueous colloidal chlorophyll solutions can be greatly diminished by the addition of MgCO_3 , and to a lesser degree by the addition of CaCO_3 . These substances as well as gelatin also decrease the rate of addition of CO_2 to chlorophyll. Glycocoll, glucose, and starch exhibit no protective action.—V. *The constant photosynthetic coefficient during augmented photosynthesis.* The value of the photosynthetic coefficient, $\frac{\text{CO}_2}{\text{O}_2}$, for oxalic acid as the first reduction product = 4; for formic acid = 2; for glycollic acid = 1.33 for formaldehyde = 1. The difficulty of separating photosynthetic from respiratory activity has made accurate determination of the photosynthetic coefficient impossible. By sufficiently increasing photosynthetic activity, with high CO_2 content of air (5 per cent) and intense illumination, the inaccuracies incident to determining the respiratory activity become negligible in the determination of the photosynthetic coefficient. In experiments lasting 1–6 hours at $10\text{--}35^\circ\text{C}$. the coefficient was found to equal 1 constantly. In succulents, *Opuntia*, the coefficient equals 0.44 at first and after continued illumination reaches 0.85.—VI. *The dependence of photosynthesis upon small quantities of oxygen.* Removal of O_2 from the atmosphere greatly influences photosynthetic activity. Some species (*Pelargonium zonale*) lose the power to fix CO_2 when kept in an atmosphere of about 0.01 per cent O_2 and do not regain it in the presence of O_2 . Other species, for example, *Cyclamen beropalmum*, show slight photosynthesis in such an atmosphere, the rate increasing slowly with continued exposure. The longer the exposure to an O_2 -free atmosphere, the lower is the photosynthesis and the more incomplete is the recovery of the leaf.—VII. *Investigations on the intermediate steps in photosynthesis.* This is a critical discussion of the experiments of others on the formation of CH_2O in the leaf and with chlorophyll preparations. SCHRYVER's experiments were repeated with pure preparations of chlorophyll and no CH_2O was found. Colloidal chlorophyll solutions do not take up CH_2O . The experiments of USHER and PRIESTLY and of CHODAT and SCHWEITZER were repeated with pure colloidal chlorophyll preparations and with and without catalase; CH_2O was never found. Chlorophyll is relatively stable towards O_2 in the light; the first steps in photooxidation do not yield aldehydes nor lower peroxides. These latter substances found by other workers are products of the photooxidation of impurities accompanying the chlorophyll.—H. A. Spoehr.

METABOLISM (GENERAL)

1006. ANDERSON, R. J. Acerin: the globulin of maple seed (*Acer saccharinum*). Jour. Biol. Chem. 46¹: xxxvi. 1921.—The principal protein of the maple seed has been isolated and purified. The name acerin is proposed. It was not obtained in crystalline form, but separated on dialysis in small globular particles. Purified acerin is a nearly white, heavy powder which on combustion leaves no weighable ash.—*G. B. Rigg*.

1007. CLOWES, G. H. A., AND E. BACHMAN. A volatile sperm-stimulating substance derived from marine eggs. Jour. Biol. Chem. 46¹: xxxi. 1921.

1008. COLIN, M. H. L'inuline chez les végétaux, genese et transformation. [Formation and transformation of inulin in plants.] Rev. Gén. Bot. 31: 75-80, 179-195, 229-250, 277-286. 1919.—A method for the separation of inulin from the other carbohydrates is given. Inulin is formed by the condensation of sugars in the tissues of the root and stem, both glucose and fructose serving as materials for its formation, although hydrolysis yields, of course, only levulose. In the plants studied by the author, inulin appears in special members, as in the fleshy roots of dahlia, and in the subterranean stems of the tuberous sunflower. The tubercles of dahlia at the beginning of their development are rich in saccharose. In some of the plants studied inulin is replaced, at the time of rapid growth, by substances hydrolyzed with extract of yeast. In other cases saccharose appears in such quantities as cause the sap to become dextrorotary.—In the roots and tubercles of some of these plants is found an enzyme which is similar to sucrase of the yeast. It hydrolyzes not only saccharose, but also levulosans of low molecular weight.—*J. M. Brannon*.

1009. COOK, F. C. Composition of tubers, skins and sprouts of three varieties of potatoes. Jour. Agric. Res. 20: 623-635. 1921.—Chemical analyses are furnished of the 3 varieties Rural New Yorker, Green Mountain, and Irish Cobbler.—*D. Reddick*.

1010. ELLIS, N. R., H. STEENBOCK, AND E. B. HART. Some observations on the stability of the antiscorbutic vitamine and its behavior to various treatments. Jour. Biol. Chem. 46: 367-380. 1921.

1011. FELTON, L. D. A colorimetric method for determining the hydrogen ion concentration of small amounts of fluid. Jour. Biol. Chem. 46: 299-305. 1921.

1012. FREUDENBERG, KARL. Neuere Ergebnisse auf dem Gebiete der Gerbstoff-Forschung. [Results of recent investigations on tannin.] Naturwissenschaften 8: 903-907. 1920.—This is a presentation of the recent studies of FISCHER and others on the chemistry of the complicated group of tannic substances. The term tannin covers a large range of substances for which it is difficult to give any general characterization. Freudenberg classifies the tannins into 4 groups, (a) ester tannic substances, (b) catechin and its tannins, (c) tannins of the oak, and (d) ellagentannins.—*Orton L. Clark*.

1013. JORISSEN, A. Recherches sur la cyanogenèse. Une réaction de l'acide citrique. [Investigations on cyanogenesis; a reaction of citric acid.] Bull. Acad. Roy. Belgique, Cl. Sci. 1919: 731-737. 1919.—The author has recently shown that hydrocyanic acid is rapidly formed, in the cold, when very dilute aqueous solutions of citric acid are exposed to diffuse light in the presence of traces of iron compounds and of nitric acid. The reaction occurs under conditions comparable with those in the living cell.—He now gives further precise indications upon this topic of cyanogenesis and also indications concerning the identification of citric acid.—*Henri Micheels*.

1014. MENAUL, P. Note on the formation of hydrocyanic acid in plants. Jour. Biol. Chem. 46: 297. 1921.—Experimental results indicate that prussic acid may be formed in plants by the action of formaldehyde on nitrates.—*G. B. Rigg*.

1015. NESTLER, A. Zur Kenntnis des Rhinanthocyans. [Rhinanthocyan.] Ber. Deutsch. Bot. Ges. 38: 117-121. 1920.—The author gives an account of various methods which he employed in extracting and splitting the glucoside, rhinanthin, which is responsible for the production of so-called blue bread from flour made from grain which contains seeds of *Alectrolophus hirsutus*, *Melampyrum arvense*, and other rhinanthin-containing seeds. In the author's experiments the glucoside was secured from the former of the 2 plants mentioned. The blue color of the alcohol-hydrochloric acid extract of the seeds, which is due to the splitting by the acid of the rhinanthin into rhinanthocyan and sugar, changes to orange red or red brown upon addition of potassium or sodium hydroxide. The blue color does not return after subsequent addition of acid. Hydrochloric acid splits the rhinanthin more effectively than sulphuric acid, and the decomposition is also brought about by oxalic, citric, lactic, and acetic acids. In the case of blue-bread production, lactic acid rather than acetic acid is responsible for the splitting, since the acetic acid is relatively weak in its ability to bring about the reaction. Good extraction media are 70 per cent alcohol plus 5 per cent hydrochloric acid, hot alcohol, and hydrochloric acid in distilled water. The colored solution of rhinanthocyan, however secured, undergoes alteration on standing. The color secured by extraction of the seeds with a medium containing acid, and also the green color of chloroform shaken with the colored extract, disappear when these liquids are passed through the ultrafilter of Wolfgang Ostwald.—R. M. Holman.

1016. PETERSON, W. H., AND HELEN CHURCHILL. The carbohydrate content of the navy bean. Jour. Amer. Chem. Soc. 43: 1180-1185. 1921.—The completeness of the digestion of the carbohydrates of legumes by malt diastase is enhanced by fine grinding. Such interfering substances as cellulose or protein are broken up and starch is exposed to the action of the enzyme. The authors found the iodine test extremely sensitive to small amounts of starch, but they also conclude that substances other than starch might give the iodine test.—J. M. Brannon.

1017. PETERSON, W. H., E. B. FRED, AND J. H. VERHULST. The destruction of pentosans in the formation of silage. Jour. Biol. Chem. 46: 329-338. 1921.—The corn fodder examined contained an average of 21.8 per cent of pentosans. During fermentation some of the pentosans were destroyed. Pentoses or other furfural-yielding substances, soluble in water, were present in the silage throughout the fermentation. The production of these substances is probably due to the action of microorganisms.—G. B. Rigg.

1018. SHAFFER, P. A., AND A. F. HARTMANN. The iodometric determination of copper and its use in sugar analysis. I. Equilibria in the reaction between copper sulphate and potassium iodide. II. Methods for the determination of reducing sugars in blood, urine, milk and other solutions. Jour. Biol. Chem. 45: 349-364, 365-390. 1921.

1019. SHAW, R. H., AND P. A. WRIGHT. A comparative study of the composition of the sunflower and corn plants at different stages of growth. Jour. Agric. Res. 20: 787-792. 1921.—Chemical composition of sunflower (*Helianthus*) and corn (*Zea mays*) at the silage stage differs principally in the amount and character of the carbohydrates. Tables of analyses are given showing total protein, albuminoid protein, reducing sugars, non-reducing sugars, and starch at several different stages of development.—D. Reddick.

1020. TOTTINGHAM, W. E., R. H. ROBERTS, AND S. LEPKOVSKY. Hemicellulose of apple wood. Jour. Biol. Chem. 45: 407-414. 1921.—Analysis of apple wood from fruiting branches shows a high content of the acid-hydrolyzable material commonly designated as hemicellulose. The alcohol-soluble fraction resulting from partial hydrolysis of this material has been found to contain large amounts of xylose and glucose, with a little galactose. It is suggested that this hydrolyzable material forms a reserve source of carbohydrate in the metabolism of the apple tree.—G. B. Rigg.

METABOLISM (NITROGEN RELATIONS)

1021. BEIJERINCK, M. W. Chemosynthese bij denitrificatie met zwavel als energie. [Chemosynthesis and denitrification with sulphur as a source of energy.] Verslag. K. Akad. Wetenschappen Amsterdam 29: 845-856. 1920.

1022. BREWSTER, J. F. The use of edestin in determining the proteolytic activity of pepsin. Jour. Biol. Chem. 46: 119-127. 1921.—A method for the preparation of standard edestin from hemp seed is given, and also a method for the assay of pepsin based on the use of this standard preparation.—*G. B. Rigg.*

1023. COHN, E. J. A physicochemical method of characterizing proteins. II. Jour. Biol. Chem. 46: iii-iv. 1921.—Glutenin and serum globulin are precipitated as undissociated molecules at their isoelectric point. Experimental evidence suggests that there is a physicochemical basis for our present classification of simple proteins.—*G. B. Rigg.*

1024. JOHNS, C. O., AND C. E. P. GERSDORFF. The proteins of the tomato seed, *Solanum esculentum*. Jour. Biol. Chem. 46: xxvi. 1921.—A 4 per cent aqueous solution of sodium chloride extracts the maximum amount of protein. Two globulins, both high in sulphur, were found.—*G. B. Rigg.*

1025. JOHNS, C. O., AND H. C. WATERMAN. Conphaseolin: a new globulin from the navy bean. Jour. Biol. Chem. 46: xlv. 1921.

1026. MILLER, HARRY G. Distribution of nitrogen in the alfalfa seed. Jour. Amer. Chem. Soc. 43: 906-914. 1921.

METABOLISM (ENZYMES, FERMENTATION)

1027. FRED, E. B., W. H. PETERSON, AND J. A. ANDERSON. The relation of lactic acid bacteria to corn silage. Jour. Biol. Chem. 46: 319-327. 1921.—Organisms of the *Lactobacillus pentoceticus* type play an important part in the chemical changes produced. They are present throughout the fermentation, and in the last stages are the predominant type. Organisms of the *Bacillus lactis acidi* type persist and act only during the first days of the fermentation. The production of alcohol is undoubtedly due in part to the action of the pentose-fermenting type.—*G. B. Rigg.*

ORGANISM AS A WHOLE

1028. DALE, H. H. The biological significance of anaphylaxis. Proc. Roy. Soc. London B. 91: 126-147. 1920.

1029. FUNK, GEORG. Ueber das Verhalten der *Oscillatoria amphibia* Ag. im Kolonie-Verband. [The behavior of *Oscillatoria amphibia* Ag. in colony-union.] Ber. Deutsch. Bot. Ges. 38: 267-274. Fig. 1. 1920.—The author explains methods of obtaining relatively pure cultures of the organism for experimentation. He observes the movements due to causes residing within the organisms themselves when the cultures are placed, in varying quantities, in Petri dishes and in glass tubes filled, sealed, and laid horizontally. He also reports their behavior when stimulated by external agencies, for example, light, heat, and electricity. Further experimentation is in progress with a view to determining the causes of reactions.—*N. L. Gardner.*

1030. JOSHIA, N. V. Studies on the root nodule organism of the leguminous plants. Mem. Dept. Agric. India Bact. Ser. 1: 247-276. 1920.—The cross inoculation experiments made indicate that there is only a single species of the legume nodule organism, when nitrogen fixation and stimulation are taken as the criteria. Where inoculation did not lead to nodule formation the plants were still found to derive benefit from the nitrogen fixed by the micro-organism. The root-nodule organism was found to exert a beneficial influence on gramina-

ceous as well as leguminous plants. Benefit was derived by plants in a pot when the micro-organism was grown in a porous cylinder placed in the center of the pot. Inoculation with *Azotobacter* gives similar results to those obtained with the nodule organism when the latter does not bring about nodule formation.—*J. J. Skinner*.

1031. MACDONALD, MARGARET, AND E. V. MCCOLLUM. The cultivation of yeast in solutions of purified nutrients. *Jour. Biol. Chem.* 45: 307-311. 1921.—Experiments indicate that yeast either grows in the absence of any special growth-promoting substance or that it synthesizes the substance to meet its own needs.—*G. B. Rigg*.

1032. NELSON, V. E., E. I. FULMER, AND RUTH CESSNA. The nutritional requirements of yeast. III. The synthesis of water-soluble B by yeast. *Jour. Biol. Chem.* 46: 77-81. 1921.—Yeast can synthesize water-soluble B.—*G. B. Rigg*.

1033. PEARL, RAYMOND. The biology of death. II. Conditions of cellular immortality. *Sci. Monthly* 12: 321-335. *Fig. 1-6*. 1921.—The work of JACQUES LOEB on artificial parthenogenesis, FRANK R. LILLIE's work on fertilization, LEO LOEB's successful cultures of somatic cells and tissues outside of the body, HARRISON and BURROW's improved technique in this same field, and CARREL's work with adult tissue of mammals, actual growth and development of new cells and new individuals in vitro secured by H. V. WILSON, Dr. and Mrs. W. H. LEWIS's discovery that growth takes place in tissues outside of the body in inorganic solutions, Carrel's success in keeping cells alive longer than the normal life of these (with the promise of indefinite continuation of the same),—these all lead to the conclusion that the essential tissues of the metazoan body are potentially immortal. Senescence is to be regarded as an attribute of the multicellular body as a whole and not a primary attribute of the physiological economy of cells as such. It shows that purely cytological methods are not suitable for investigating causes of senescence.—*L. Pace*.

1034. PEARL, RAYMOND. The biology of death. *Sci. Monthly* 12: 444-447. 1921.—This article continues the discussion of this subject, giving tables showing chances of life or death of different periods, and ages of the individual, with an analysis of these data.—*L. Pace*.

1035. WILLIAMS, R. J. Vitamines and yeast growth. *Jour. Biol. Chem.* 46: 113-118. 1921.—Bakers' yeast and brewers' yeast were used. The growth of each is stimulated more by its own extract than by that of the other. This is interpreted to mean that there is some specificity in growth stimulants, but not necessarily 2 totally different substances stimulating the growth of the 2 varieties. Some results present the possibility that the antiscorbutic vitamine, as a secondary factor, may stimulate yeast growth.—*G. B. Rigg*.

GROWTH, DEVELOPMENT, REPRODUCTION

1036. BRANNON, J. M. A simple method for growing plants. *Amer. Jour. Bot.* 8: 176-178. *Fig. 1*. 1921.—The author has grown plants successfully when completely immersed in sterilized and sealed culture solutions containing sugar and mineral salts. Flax, alfalfa, corn, peas, and timothy may be readily grown in this way and thrive better than in agar or in the ordinary water culture. The author points out the particular advantage of this method when plants are to be grown in the dark.—*E. W. Sinnott*.

1037. HARRIS, J. A., AND H. S. REED. Inter-periodic correlation in the analysis of growth. *Biol. Bull. [Woods Hole]* 40: 243-258. *2 fig.* 1921.—From a series of data collected by one of the authors the attempt is made to illustrate the application of inter-periodic correlation coefficients to the problem of growth. In the discussion the following terms are used and defined. Growth stage is the time at which a series of organisms is measured. Growth period is the time elapsing between the *sth* and the *s+nth* growth stage, and the growth increment is the increase in size during such period. The relative growth increment

is the ratio of the growth increment to the absolute size of the individual at a given stage. Three problems were under consideration, namely: (1) The correlation between the absolute size of an organism at its several periods of development; (2) the correlation between the growth increments of the organism during the several growth periods; (3) the correlation between the absolute size of the organism at given stages of development and subsequent growth increments. A discussion of each problem follows. *Helianthus* plants were used for study. The general results show that the actual size of an individual at any stage of development is closely correlated with its size at other closely correlated stages of development but rapidly diminishes as the growth stages become widely separated. Also the ultimate size of an organism is only slightly determined by its initial size. The correlation between successive growth increments is positive in sign and has the general average of .501. The correlation for increments of weekly periods separated by an interval of 1 week is about .225. The correlation between growth increments more widely separated is on the average negative in sign. Plants which grow rapidly during a certain stage of development will grow more rapidly during a closely associated period, but widely separated periods have little or no relationship between the growth increments. The growth increment is positively correlated with its size at an immediately preceding stage. In the early stages the growth increments of 2 or 3 subsequent periods during the early stages of growth are positively correlated with the initial size of the organism.—*T. J. Fitzpatrick.*

1038. REED, HOWARD S. Growth and sap concentration. *Jour. Agric. Res.* 21: 81-98. 7 fig. 1921.—Material for the investigation consisted of walnut (*Juglans*) and apricot (*Prunus armeniaca*) trees, both in their 2nd year of growth, and of new shoots of orange (*Citrus*).—The 2 variables, growth and concentration of sap, vary in opposite directions. As the season advances the concentration of sap increases and, in apricot, continues to increase after active growth ceases. This is largely a matter of the accumulation of solutes, although diminished absorption of water may be responsible in part. Addition of water to the soil usually results in a diminution of sap concentration. This is the only one of the external factors considered that seems to affect concentration. Sap concentration of shoots on heavily pruned trees is lower than that of shoots from unpruned trees. A concentration gradient exists in the shoots, the concentration of sap at the tips being greater than at the base of shoots. Low concentrations of sap in the shoot as a whole appear to be associated with abundant water intake and rapid vegetative growth, while higher concentrations are associated with slow growth and fruit-bud formation. Summer pruning of fruit trees is not only unnecessary but may be detrimental.—*D. Reddick.*

1039. SCHÜEPP, OTTO. Über Form und Darstellung der Wachstumskurven. [The form and representation of growth curves.] *Ber. Deutsch. Bot. Ges.* 38: 193-199. 1920.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1040. OEHLKERS, FRIEDRICH. Zur reizphysiologischen Analyse der post-floralen Krümmungen des Blütenstiels von *Tropaeolum majus*. [An analysis of the post-floral curvatures of the peduncle of *Tropaeolum majus*.] *Ber. Deutsch. Bot. Ges.* 38: 79-83. 1920.—This is a preliminary report. The curvatures in question begin about 12 hours after the pollination of the protandrous flowers. First, the apical zone of the peduncle, beginning just below the ovary, bends through about 90°. The second curvature, in a 3-5 cm. zone, below the region of the first curvature, occurs within the next 24 hours; and this curvature may amount to as much as 270°, generally lessened somewhat by a slight counter reaction. Finally, about the time of the ripening of the seeds, a short zone at the base and in the axil of the subtending leaf curves in the same direction as the above. By experiments with peduncles detached from the plant and subjected to unilateral illumination, by rotation upon the clinostat, and by retention in the dark room, the author has attempted to find an explanation for the first 2 curvatures and for the variations which sometimes occur in the reactions of plants growing outdoors. His principal conclusions are that the post-floral curvatures represent a combined sensitive reaction which can be accounted for only on the basis of a change of

tonus, which does not depend on the fertilization of the flower. Fertilization is related to the reaction only in that it induces renewed growth. The reactions are geotropically positive and phototropically negative, they are dorsiventral, and dissimilar curvatures result from the stimulus of gravity or light alone. The normal curvature is the resultant of the geotropic and the phototropic reactions. The striking over-curvature is due to the fact that the post-floral growth progresses from the free end to the fixed base and the curvature does not displace the zone which is still capable of growth and reaction from the position of stimulation. The counter reaction is slight because the growth period is short and the reaction time very long.—*R. M. Holman.*

1041. ZOLLIKOFER, CLARA. Ueber die tropistische Wirkung von rotem Licht auf Dunkelpflanzen von *Avena sativa*. [Tropic action of red light on etiolated plants of *Avena sativa*.] Verslag. K. Akad. Wetenschappen Amsterdam 29: 551-558. 1 fig. 1920.—Experiments were conducted in a darkroom under the influence of a 100 candle-power light, surrounded by very dark ruby glass which was spectroscopically tested, the room having a constant temperature of 22.5°C. and a moisture content of 55 to 60 per cent. All reactions showed a remarkable uniformity at any definite light intensity. The lowest light intensity at which any observable phototropic action occurred was between 15 and 30 M. C. S.—*J. C. Th. Uphof.*

RADIANT ENERGY RELATIONS

1042. DISHOEK, A. F. C. VAN. Gevoeligheid voor licht van + en - stammen van *Phycomyces nitens*. [Light sensitiveness of "plus" and "minus" strains of *Phycomyces nitens*.] Verslag. K. Akad. Wetenschappen Amsterdam 29: 667-669. 1920.—In phototropic experiments with *Phycomyces nitens* the various strains do not give the same results. With one-sided illumination the sporophores of the minus strains were strongly directed toward the light, the plus strain slightly. Other observations as to light sensitiveness are given.—*J. C. Th. Uphof.*

1043. MEYER, FRITZ J. Die Licht Physiologie der Pflanzen. [The light physiology of plants.] Naturwissenschaften 8: 842-851. 5 fig. 1920.—This is a critical presentation of the results of important papers of recent years dealing with (a) light and germination, (b) light and growth, (c) light and assimilation, (d) the lethal effect of ultraviolet rays, and (e) light and plant movements.—*O. L. Clark.*

TOXIC AGENTS

1044. ATWOOD, W. M. Physiological studies of the effects of formaldehyde on wheat. [Abstract.] Phytopathology 11: 103. 1921.

1045. SEELIGER, RUD. Über einige physiologische Wirkungen des Osmium tetroxyds. [Some physiological effects of osmium tetroxide.] Ber. Deutsch. Bot. Ges. 38: 176-184. 1920.—Grains of wheat kept for 8 hours in $\frac{1}{3}$ to $\frac{1}{4}$ per cent solutions of osmium tetroxide subsequently showed 100 per cent germination. Some germinated even after similar treatment with 1 per cent solution. The harmful effect of the tetroxide was evident in the slower germination of the wheat, in the slower growth of the seedlings, and in a permanent dwarfing of the plants.—*R. M. Holman.*

SOIL SCIENCE

J. J. SKINNER, *Editor*

F. M. SCHERTZ, *Assistant Editor*

(See also in this issue Entries 585, 588, 589, 590, 595, 596, 604, 605, 606, 616, 620, 638, 682, 790, 820, 1030)

GENERAL

1046. BOUYOUCOS, GEORGE. The amount of unfree water in soils at different moisture contents. Soil Sci. 11: 255-259. 1921.—By the use of the dilatometer the amount of unfree

water in 12 soils at 5 or 6 different water contents was determined. The amount of unfree water in a given soil does not vary with the water content but appears to remain constant.—*W. J. Robbins.*

1047. GARDNER, WILLARD, AND JOHN H. WIDTSOE. The movement of soil moisture. *Soil Sci.* 11: 215-232. 11 fig. 1921.—A mathematical discussion of the movement of water through soil.—*W. J. Robbins.*

1048. GUTHRIE, F. B., A. A. RAMSEY, R. M. PETRIE, AND F. J. STOKES. List of fertilizers in New South Wales. *Agric. Gaz. New South Wales* 32: 277-284. 1921.—A list is given showing the composition of fertilizers on the market.—*L. R. Waldron.*

1049. HOWARD, ALBERT. Investigaciones recientes sobre o arejamento dos solos. [Recent investigations on the aeration of soils.] *Bol. Agric. [Nova Goa, Portuguese East India]* 1: 254-264. 1919.—Translation of a paper given before the Indian Congress of Science, 1919.—*John A. Stevenson.*

1050. JURITZ, CHAS. F. Calcium cyanamide. Its agricultural use as a fertilizer. *Jour. Dept. Agric. Union of South Africa* 1: 765-769. 1920.—A discussion of calcium cyanamide is presented, including manufacture and agricultural uses. A review of the literature showing its comparative value and cautions to be observed in its use is given.—*Lyman Carrier.*

1051. JURITZ, CHAS. F. Wheat straw and its value to the land. *Jour. Dept. Agric. Union of South Africa* 1: 712-717. 1920.—The disposal of wheat straw in the various districts of the South African Union is discussed. The value of the material as a fertilizer is discussed, and chemical analyses are given. The utilization of all wheat straw as fertilizer is recommended, by applying either directly to the soil or indirectly by feeding to animals, or using as a litter and then applying the manure to the land.—*Lyman Carrier.*

1052. KAZAKOV, A. Znachenie Viatskikh fosforitnykh zalezhei v dele podniatiia zemledeliia v Rossii. [Importance of the Viatka phosphate deposits.] *Narodnoe Khoziaistvo [Moscow]* 1920: 66-68. 1920.—A systematic survey of the last 2 years has shown that the Viatka phosphate deposits, from a commercial point of view, are superior even to the world-famous South Carolina deposits. While being equal to the latter in its quality and in conditions of exploitation, the Viatka or Kama layer is twice as thick as the Carolina layer. There are enormous quantities of cheap fuel (wood) in the vicinity and it is the only deposit in European Russia that permits exploitation by the open method with an extensive application of powerful machinery.—*M. Shapovalov.*

1053. KEEN, B. A. The physical investigation of soil. *Sci. Prog. [London]* 15: 574-589. 1921.—A general review of the subject of soil physics together with its relation to agriculture is given under the following heads: (1) The dimensions of the individual particles and the manner of their arrangement, (2) soil moisture, (3) soil temperature, and (4) soil atmosphere.—*J. L. Weimer.*

1054. LIPMAN, C. B. Report on soils. *Jour. Assoc. Official Agric. Chem.* 4: 388-389. 1921.—A report is presented of progress in determining phosphorus in soils.—*F. M. Schertz.*

1055. MCCALL, A. G. The effect of manure-sulphur composts upon the solubility of the potassium of greensand. *Jour. Assoc. Official Agric. Chem.* 4: 375-376. 1921.—The potassium of greensand was made water soluble through sulphofication, the most effective compost containing sulphur and manure in equal amounts. When part of the manure was replaced by soil, sulphofication was reduced and consequently less potash was rendered water-soluble; while if all of the manure was replaced by soil only a very small amount of potash was found in the water extract. A greater total amount of water-soluble potash was recovered in the composts containing high-potassium greensand, but a greater percentage of total potassium

was liberated from the low-potassium greensand. In composts containing manure the total amounts of potash recovered in the water extracts varied from 9.1 to a maximum of 41.3 per cent of the total initial amount present.—*F. M. Schertz.*

1056. MCCOOL, M. M., AND L. C. WHITING. Some studies on the rate of formation of soluble substances in several organic soils. *Soil Sci.* 11: 233-247. 4 fig. 1921.—By means of the freezing point method the rate of formation of soluble material was determined in 7 organic soils under different moisture and temperature conditions and at different depths. At any given moisture content, higher temperatures tend to bring more material into solution and lower temperatures decrease the rate of formation. In general, the ability to yield soluble materials decreased regularly from the surface to the water-table. The zone of weathering and the region of greatest activity closely coincide.—*W. J. Robbins.*

1057. MACINTIRE, W. H., AND C. A. MOOERS. A pitless lysimeter equipment. *Soil Sci.* 11: 207-213. Pl. 1-2, fig. 1. 1921.—A lysimeter system not requiring a concrete enclosure and costing \$500 for a 12-unit system is figured and described. It consists essentially of a pair of cylindrical iron tanks, the inner of which holds the soil. Arrangements are made for removing the leachings from the outer tank by means of a pump.—*W. J. Robbins.*

1058. MACINTIRE, W. H., F. J. GRAY, AND W. M. SHAW. The non-biological oxidation of elemental sulphur in quartz media. *Soil Sci.* 11: 249-259. 1921.—Elemental sulphur will oxidize upon moist contact with relatively pure quartz under both aerobic and CO_2 anaerobic conditions. Metallic iron depresses the oxidation, limonite accelerates it. Several carbonates under aerobic conditions increase the oxidation. Elemental sulphur may be oxidized to sulphates in a silicious medium solely by chemical reactions.—*W. J. Robbins.*

1059. PETERSON, ALVAH. Some soil fumigation experiments with paradichlorobenzene for the control of the peach tree borer, *Sanninoidea exitosa* Say. *Soil Sci.* 11: 305-319. Pl. 1, 1 fig. 1921.—If the soil temperature is 55-60°F. and the soil not too wet, $\frac{1}{2}$ to 1 oz. of paradichlorobenzene will kill 90-100 per cent of the peach-tree borers. It can be safely applied to trees 6 years of age or older. It should be placed in a narrow band about the base of the tree approximately 2 inches from the trunk. The material should be covered with several shovels of soil.—*W. J. Robbins.*

1060. ROST, CLAYTON O., AND FREDERICK J. ALWAY. Minnesota glacial soil studies I. A comparison of soils on the late Wisconsin and Iowan drifts. *Soil Sci.* 11: 161-205. Pl. 1-3, 7 fig. 1921.—A comparison was made of the physical and chemical composition of 3 soil types occurring on 2 adjacent drifts of similar original till but of different geologic age. No distinct differences between the 2 drifts were found in texture, or content of silicon, aluminum, potassium, sodium, magnesium, non-carbonate lime, nitrogen, or organic carbon. The soils on the older drift are considerably richer in phosphoric acid and contain appreciably more iron and titanium. It would appear that the only distinct influence which the greater age of the Iowan drift has been able to exert upon the soils developed upon it is confined to the leaching out of carbonates to a greater depth and an enrichment of the surface layers in phosphoric acid.—*W. J. Robbins.*

1061. STEWART, GUY R. The effect of continuous cropping upon the major soil nutrients. *Soil Sci.* 11: 321-323. 1921.—Two sets of soils in containers holding 1800 lbs., 1 set very similar and consisting of 6 clay loams, the other dissimilar and consisting of 7 fine sandy loams, have been cropped continuously for 6 seasons. The average decrease in crop yield amounts to 35.2 per cent for the straw and 34.4 per cent for the grain. In 5 of the 7 sandy loams there has been a reduction of 30 per cent or more of the soluble phosphates while only 2 of the clay loams have begun to show a decrease. Determinations before the soils were planted showed that the fine sandy loams contained 0.05-0.09 per cent, the silty clay 0.13-0.18 per cent of total nitrogen. At the close of 1919 all the soils, both planted and fallow, showed a reduction of 14-38 per cent of their original total nitrogen content.—*W. J. Robbins.*

1062. WYANT, ZAE NORTHRUP. A comparison of the technic recommended by various authors for quantitative bacteriological analysis of soil. *Soil Sci.* 11: 295-303 1921.—A study of the literature and analysis of the methods found there for the quantitative bacteriological analysis of soil are presented.—*W. J. Robbins.*

LIME STUDIES

1063. HARTWELL, BURT L. Need for lime as indicated by relative toxicity of acid soil conditions to different crops. *Jour. Amer. Soc. Agron.* 13: 103-112. 1921.—The kind of plant to be grown determines, more than any other factor, the amount of lime to apply to the soil.—*F. M. Schertz.*

1064. MACINTIRE, W. H. Report on the lime absorption coefficient of soils. *Jour. Assoc. Official Agric. Chem.* 4: 389-390. 1921.—The author recommends the Jones method, as follows: To 5.6 gm. of soil add 0.5 gm. of calcium acetate (tested reagent), place in a mortar and mix; add water to make a fairly stiff paste. Pestle for 20 seconds, add 30 cc. of water, and continue the mixing for 30 seconds. Wash into a 200 cc. flask and keep the bulk down to about 160 cc. Let stand, with occasional shaking, for 15 minutes. Make up to a bulk of 200 cc., mix, and filter through a dry filter. Discard the first 10-15 cc., which may be cloudy; a Büchner funnel is recommended for filtering. Titrate 100 cc. of the clear filtrate, using phenolphthalein as an indicator, with N/10 NaOH. This reading multiplied by 2 gives the number of cc. of N/10 alkali required to neutralize the acetic acid in 200 cc. of the solution. This figure times the factor 1.8 times 1000 indicates the pounds of CaO required per 2,000,000 pounds of soil.—*F. M. Schertz.*

1065. PIPER, C. V. The symposium on liming. *Jour. Amer. Soc. Agron.* 13: 89-90. 1921.—A brief synopsis of definitely known facts and the more or less controversial problems in regard to the agricultural use of lime.—*F. M. Schertz.*

1066. SCHOLLENBERGER, C. J. Lime requirements and reaction of lime materials with soil. *Soil Sci.* 11: 261-276. 1921.—Various lime materials were mixed with soil in undrained pots and at intervals the residual carbonate, accumulated nitrate, and lime requirement were determined. Caustic lime was most reactive followed by precipitated calcium carbonate and "dicalcium silicate"; high-calcium limestone, calcite, and magnesite; natural carbonate dolomite; and blast furnace slag. The interaction of soil constituents and calcium carbonate is sufficiently regular and quantitative to show the lime requirement based upon the reaction. The preparation of the sample, temperature, and time allowed for the determination are of considerable importance. Heating is not undesirable in a perfect lime-requirement test.—*W. J. Robbins.*

1067. WORTH, F. G., AND PO SAW MAUNG. Absorption of lime by soils. *Mem. Dept. Agric. India Chem. Ser.* 5: 157-171. 1919.—The lime-absorbing power of a number of local soils was studied by the addition of a measured amount of calcium bicarbonate to a weighed amount of soil, the mixture digested for 6 hours, then filtered and titrated. A theoretical discussion of the results is given.—*J. J. Skinner.*

PEAT

1068. AIYER, P. A. SUBRAMANIA. The gasses of swamp rice soils. Part V. A methane-oxidizing bacterium from rice soils. *Mem. Dept. Agric. India Chem. Ser.* 5: 173-180. 1920.—The oxidation of methane in paddy rice soils is caused by the bacterium *B. fluorescens liquefaciens*. Organic matter interferes with the bacterium; the oxidation proceeds in purely mineral media.—*J. J. Skinner.*

1069. ALWAY, F. J. Experimental work on Minnesota peat soils. *Jour. Amer. Peat Soc.* 14: 40-47. 1921.

1070. BEATTIE, J. H. Truck growing on muck in the Kankakee marsh of northern Indiana. *Jour. Amer. Peat Soc.* 14: 32-39. 1921.—Onions, cabbage, and celery were grown. Applica-

tions of nitrate of soda, tankage, acid phosphate, and lime had very little effect. The application of potash salts, particularly muriate, and manure gave marked increases.—*G. B. Rigg.*

1071. BOTTOMLEY, W. B. Treatment of peat. Jour. Amer. Peat Soc. 14: 56. 1921.—Canadian patent 206,416 covers a method of producing auxinomes (growth-promoting substances) in peat.—*G. B. Rigg.*

1072. HARRISON, W. H. The gases of swamp rice soils, part VI. Carbon dioxide and hydrogen in relation to rice soils. Mem. Dept. Agric. India Chem. Ser. 5: 181-194. 1920.—Carbon dioxide and H do not exist in association in paddy rice soils. Carbon dioxide is apparently reduced by H as fast as it is formed, resulting in the formation of marsh gas and organic matter. This reaction is said to be an important factor in the conservation of the oxygen, which remains available for root aeration.—*J. J. Skinner.*

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See also in this issue Entries 848, 874, 984)

GENERAL

1073. BRITTON, N. L. Investigations of the flora of northern South America. Science 53: 29. 1921.—In 1918 a cooperative effort was made by the New York Botanical Garden, the United States National Museum, and the Gray Herbarium to investigate the botany and plant products of northern South America. The investigation has made good progress through the study of specimens already obtained in Dutch and British Guiana, Trinidad, Tobago, Venezuela, Curaçao, Colombia, and Ecuador. This undertaking has been furthered by the heartiest cooperation on the part of leading men in the countries concerned. A wealth of material hitherto unknown to science has already been identified, and many facts are being added to our knowledge of the flora and its geographic distribution.—*A. H. Chivers.*

1074. HU, HSIEN SU. The botanical names of Chekiang plants.] Ko-Hsueh [Science-Publ. Chinese Sci. Soc.] 6: 70-101. 1921.—A list of botanical names for 302 species of vascular plants collected in the province of Chekiang is presented with the equivalent Chinese names in characters. The name of the locality where each plant was collected is also indicated in the list.—*Chunjen C. Chen.*

1075. NAKAI, TAKENOSHIN. Notulae ad Plantas Japoniae et Koreae, XXIII. [Notes on the plants of Japan and Korea XXIII.] Bot. Mag. Tôkyô 34: 141-158. 1920.—Two new genera, *Crepidiastrum* (Compositae) and *Paraixeris* (Compositae), and the following new species, varieties, and combinations are made: *Dryopteris oligophlebia* var. *lasiocarpa* (Hayata) and *D. purpurascens* (Blume), *Eria bidentata*, *Eulophia Toyoshimae*, *Stachyurus Matsuzakii*, *Stellera rosea*, *Crepidiastrum ameristophyllum* (Nakai), *C. grandicollum* (Koidzumii), *C. Keiskeanum* (Maximowicz), *C. koshunense* (Hayata), *C. lanceolatum* (Houttuyn), *C. lanceolatum* forma *typicum* (Makino), *C. lanceolatum* var. *latifolium* (Nakai), *C. linguaefolium* (A. Gray), *C. Quercus* (Léveillé & Vaniot), *C. taiwanianum* (Nakai), *Ixeris longirostra* (Hayata), *I. Matsumurae* (Makino), *I. microcephala* (Nakai), *I. nipponica* (Nakai), *I. sonchifolia* (Bunge), *I. sororia* (Miquel), *Paraixeris chelidoniifolia* (Makino), *P. denticulata* (Houttuyn), *P. denticulata* forma *typica* (Maximowicz), *P. denticulata* forma *pinnatifidipartita* (Makino); *P. denticulato-platyphylla* (Makino), *P. Yoshinoi* (Nakai).—*Roxana Stinchfield Ferris.*

1076. PENNELL, FRANCIS W. "Unrecorded" genera of Rafinesque—I. Autikon Botanikon (1840). Bull. Torrey Bot. Club 48: 89-96. 1921.—Certain of the papers by Rafinesque were not seen by the bibliographers who compiled the Index Kewensis; for example, his papers

in the American Monthly Magazine and his Autikon Botanikon. A list is here given of some 83 new genera published in the Autikon, naming the type species and the affinities of each genus.—P. A. Munz.

1077. PORSILD, MORTEN P. The structure and biology of arctic flowering plants. 14. Liliales. Meddel. om Grönland 37: 345–357. Fig. 1–8. 1920.—Notes are given concerning the distribution of several liliaceous arctic plants. Three species of *Tofieldia* are treated in detail with remarks on anatomy, morphology, and ecology.—E. B. Payson.

1078. R., A. B. The Cambridge British Flora. [Rev. of: Moss, C. E. The Cambridge British Flora. Vol. iii. Portulacaceae to Fumariaceae. xvi + 200 p., vi + 191 pl. University Press: Cambridge, 1920.] Nature 106: 337–338. 1920.—Since the previous volume, the editor has left England and the artist has died. Increased cost of production has necessitated raising the price to nearly 3 times that of the original. Notes by Moss on arrangement, limitations of families, etc., are of considerable interest, though sometimes difficult of appreciation by the ordinary student, who may consider the elevation of *Actaea* and *Paeonia* to the rank of families as puzzling and unnecessary. [See also Bot. Absts. 8, Entry 2232.]—O. A. Stevens.

1079. SALISBURY, E. J. [Rev. of: BEWS, J. W. The grasses and grasslands of South Africa. iv + 161 p., 24 fig., 1 map. P. Davis & Sons, Ltd.: Pietermaritzburg, 1918. Sci. Prog. [London] 13: 675–676. 1919.

1080. SARGEANT, JOHN. The trees, shrubs, and plants of Virgil. Small 8vo., vii + 149 p. B. H. Blackwell: Oxford, 1920.—The author has commented on the numerous plants to which reference is made in the works of Virgil and associated with them present day scientific botanical names.—J. M. Greenman.

SPERMATOPHYTES

1081. ANONYMOUS. Novitates africanae. Ann. Bolus Herb. 3: 1–14. Pl. 1–2. 1920.—This article contains descriptions of new species by various authors. The following is a list of species described: *Diosma Marlothii* Dummer, *Barosma Bathii* Dummer, *Lebeckia elongata* Hutchinson, *Dolichos Pearsonii* Hutchinson, *Caesalpinia Pearsonii* L. Bolus, *Mesembrianthemum caespitosum* L. Bolus, *M. Strubeniae* L. Bolus, *M. purpureostylus* L. Bolus, *Geigeria pilifera* Hutchinson, *Helichrysum viscidissimum* Hutchinson, *Plumbago Pearsonii* L. Bolus, *Solanum rigescentoides* Hutchinson, *Clerodendron Teaguei* Hutchinson, *Homeria tilacina* L. Bolus, *H. bifida* L. Bolus, *H. speciosa* L. Bolus, *Watsonia Galpinii* L. Bolus, *Antholyza Watsonius* (Thunb.) L. Bolus, *A. Guthriei* L. Bolus, *A. Sladeniana* Pole-Evans, *Apicra rubiflora* L. Bolus, and *Agapanthus Walshii* L. Bolus.—E. P. Phillips.

1082. ARTHUR, J. C. New combinations for phanerogamic names. Torreya 21: 11–12. 1921.—Nine new combinations are proposed for names of plants cited as hosts for various species of Uredinales, viz.: *Cnidoscolus urens* (L.) and *Adenoropium angustifolium* (Griseb.), both transferred from *Jatropha*; *Vincetoxicum bifidum* (Hemsl.), *V. erianthum* (Decaisne) and *V. uniflorum* (HBK.), from *Gonolobus*; *Sphaeralcea arcuata* (Greene) from *Malvastrum*; *S. fasciculata* (Nutt.) from *Malva*; *Madronella viridis* (Jepson) from *Monardella*; *Coleosanthus megalodontus* (Greenm.) from *Brickellia*.—J. C. Nelson.

1083. BLAKE, S. F. Neomillspaughia, a new genus of Polygonaceae, with remarks on related genera. Bull. Torrey Bot. Club 48: 77–88. Pl. 1. 1921.—A key is given to the following genera: *Brunnichia*, *Antigonon*, *Gymnopodium*, *Neomillspaughia* gen. nov., and *Podopterus*. *Gymnopodium antigonoides* (Robinson) Blake and *G. ovatifolium* (Robinson) Blake, *Neomillspaughia paniculata* (Donn. Sm.) Blake, and *N. emarginata* (H. Gross) Blake are given as new combinations, and *Podopterus guatemalensis* Blake is described as a new species.—P. A. Munz.

1084. BOLUS, L. Notes on Compositae. Jour. Bot. Soc. South Africa 6: 9–11. 1920.

1085. BRITTON, NATHANIEL LORD. Descriptions of Cuban plants new to science. Mem. Torrey Bot. Club 16: 57-118. 1920.—New genera and species of flowering plants of Cuba are here published by the author and cooperating specialists. Unless otherwise indicated Dr. Britton is the author of the new names enumerated in the following list: *Paspalum Rocanum* Fr. Léon, *P. Edmondi* Fr. Léon, *P. acutifolium* Fr. Léon, *Cyperus camagueyensis*, *C. Underwoodii*, *Eleocharis Shaferi*, *E. minutissima*, *Fimbristylis ophiticola*, *Hymenocallis pruticola* Britton & Wilson, *Vanilla savannarum*, *Peperomia similis*, *P. cueroensis*, *P. sumideroensis*, *P. carnosa*, *P. sevilensis*, *P. trinitensis*, *P. neglecta*, *P. signaneana*, *P. Clementis*, *P. bullata*, *Portulaca cubensis* Britton & Wilson, *Hyperbaena acutifolia*, *H. littoralis*, *Xylopia Roigii* P. Wilson, *Persea Shaferi* P. Wilson, *Cassia benitoensis* Britton & Wilson, *Caesalpinia subglauca*, *C. myabensis*, *C. Hornei*, *Harpalyce macrocarpa* Britton & Wilson, *H. villosa* Britton & Wilson, *Bembicidium Rydberg* n. gen. of Leguminosae, *B. cubense* Rydberg, *Notodon cayensis* Britton & Wilson, *N. savannarum* Britton & Wilson, *Cañizaresia* n. gen. of Leguminosae, *C. cubensis* (*Piscidia cubensis* Urban), *Bradburya lobata* Britton & Wilson, *Erythrina venosa* Britton & Wilson, *Phaseolus savannarum* Britton & Wilson, *Erythroxylon Roigii* Britton & Wilson, *E. coriaceum* Britton & Wilson, *Elaphrium Shaferi* Britton & Wilson, *Bunchosia Leonis* Britton & Wilson, *Andrachne cuneifolia*, *Ramsdenia* n. gen. of Euphorbiaceae, *R. excisa* (*Phyllanthus excisus* Urban), *R. incrustata* (*Phyllanthus incrustatus* Urban), *Orbicularia scopulorum*, *O. foveolata*, *Roigia* n. gen. of Euphorbiaceae, *R. comosa* (*Phyllanthus comosus* Urban), *Conami ovalifolia*, *Dimorphocladium* n. gen. of Euphorbiaceae, *D. formosum* (*Phyllanthus formosus* Urban), *Phyllanthus Selbyi* Britton & Wilson, *P. dimorphus* Britton & Wilson, *Croton cueroensis* Britton & Wilson, *Argythamnia cubensis* Britton & Wilson, *Lasiocroton gracilis* Britton & Wilson, *L. cordifolius* Britton & Wilson, *Pera longipes* Britton & Wilson, *P. pallidifolia* Britton & Wilson, *Sapium cubense* Britton & Wilson, *Acalypha Hutchinsonii*, *Cyrilla cubensis* P. Wilson, *Ilex Shaferi* Britton & Wilson, *I. Clementis* Britton & Wilson, *Salacia nipensis*, *Sarcomphalus cubensis*, *Rhamnidium oblongifolium* Britton & Wilson, *R. orbiculatum* Britton & Wilson, *R. Rocanum* Britton & Wilson, *Cissus Torreana* Britton & Wilson, *Malache calcicola*, *Maga cubensis* Britton & Wilson, *Melochia savannarum*, *M. nipensis*, *Ouratea affinis*, *O. Roigii*, *Marcgravia calcicola*, *Haemocharis benitoensis* Britton & Wilson, *Rhedia brevipes*, *Clusia callosa* Britton & Wilson, *Hypericum ophiticola*, *Myroxylon rhombifolium* Britton & Wilson, *Lunania subcoriacea* Britton & Wilson, *L. elongata*, *Daphnopsis oblongifolia* Britton & Wilson, *Psidium nummularioides* Britton & Wilson, *P. navasense* Britton & Wilson, *P. bullatum* Britton & Wilson, *P. ophiticola* Britton & Wilson, *P. saxicola* Britton & Wilson, *Calyptanthus Clementis* Britton & Wilson, *C. Caroli* Britton & Wilson, *C. clarensis* Britton & Wilson, *Eugenia Cowellii* Britton & Wilson, *E. cabanasensis* Britton & Wilson, *E. moensis* Britton & Wilson, *E. havanensis* Britton & Wilson, *E. varia* Britton & Wilson, *E. Earlei* Britton & Wilson, *E. Rocana* Britton & Wilson, *E. clarensis* Britton & Wilson, *E. anafensis* Britton & Wilson, *E. ignota* Britton & Wilson, *E. Bakeri* Britton & Wilson, *Tamonea moensis*, *Calycogonium saxicola* Britton & Wilson, *Pachyanthus Clementis* P. Wilson, *P. mantuensis* Britton & Wilson, *Ossaea Shaferi* Britton & Wilson, *O. navasensis* Britton & Wilson, *O. nipensis* Britton & Wilson, *Kalmiella simulata* Britton & Wilson, *Rauwolfia linearifolia* Britton & Wilson, *Echites minima* Britton & Wilson, *Exogonium incertum*, *Nama cubana* P. Wilson, *Varronia Shaferi*, *Bourreria Taylori*, *Rochefortia stellata* Britton & Wilson, *R. cubensis* Britton & Wilson, *Duranta arida* Britton & Wilson, *Callicarpa Shaferi* Britton & Wilson, *C. Wrightii* Britton & Wilson, *C. cuneifolia* Britton & Wilson, *C. nipensis* Britton & Wilson, *Vitex Clementis* Britton & Wilson, *Pseudocarpidium Shaferi*, *Clerodendrum anafense* Britton & Wilson, *C. camagueyense* Britton & Wilson, *Salvia scabrata* Britton & Wilson, *S. cubensis* Britton & Wilson, *Hyptis Shaferi*, *H. rivularis*, *Physalis ignota*, *Solanum moense* Britton & Wilson, *Cestrum Wrightianum* P. Wilson, *C. Taylori* Britton & Wilson, *C. pinetorum*, *Brunfelsia Shaferi* Britton & Wilson, *B. clarensis* Britton & Wilson, *Cheilophyllum Pennell* n. gen. of Scrophulariaceae, *C. radicans* Pennell (*Stemodia radicans* Griseb.), *Silvinula* Pennell n. gen. of Scrophulariaceae, *S. humifusa* Pennell (*Herpestis humifusa* Griseb.), *Caconapea stemodioides* Pennell, *C. decumbens* Pennell (*Herpestis decumbens* Fernald), *Naiadothrix* Pennell n. gen. of Scrophulariaceae, *N. longipes* Pennell, *N. reflexa* Pennell (*Herpestis reflexa* Benth.), *N. myriophylloides* Pennell (*Herpestis myriophylloides* Benth.), *Encopella*

Pennell n. gen. of Scrophulariaceae, *E. tenuifolia* Pennell (*Encopa tenuifolia* Griseb.), *Anisantherina* Pennell n. gen. of Scrophulariaceae, *A. hispidula* Pennell (*Gerardia hispidula* Mart.), *Tabebuia camagueyensis* Britton & Wilson, *T. savannarum*, *T. Cowellii*, *Cotema* Britton & Wilson n. gen. of Bignoniaceae, *C. spiralis* Britton & Wilson (*Tecoma spiralis* Wright), *C. woodfredensis*, *C. apiculata*, *C. holguinensis*, *Gesneria yamuriensis* Britton & Wilson, *G. nipensis* Britton & Wilson, *G. clarensis* Britton & Wilson, *Pinguicula lignicola* Barnhart, *P. benedicta* Barnhart, *Utricularia mixta* Barnhart, *Tubiflora Shaferi* P. Wilson, *Machaeonia minutifolia* Britton & Wilson, *Scolosanthus lucidus*, *Psychotria Clementis*, *P. bermejalensis*, *P. moensis* Britton & Wilson, *P. toensis* Britton & Wilson, *Mitracarpum Fortunii* Britton & Wilson, *Aster Leonis*, *Gundlachia apiculata* Britton & Blake, *G. foliosa* Britton & Blake, *G. cubana* Britton & Blake, *Erigeron Taylori* Britton & Wilson, *E. Earlei* Britton & Wilson, *Borrchia cubana* Britton & Blake, *Spilanthes montana* Britton & Blake, *Chaptalia comptonioides* Britton & Wilson, *C. Shaferi* Britton & Wilson, and *C. Rocana* Britton & Wilson.—*J. M. Greenman.*

1086. CHASE, AGNES. The Linnaean concept of pearl millet. *Amer. Jour. Bot.* 8: 41-49. 1921.—Owing to the confusion of names for pearl millet, the author has made a careful analysis of the Linnaean names involved in the problem. To bring order out of this confusion, she recommends rejection of the names *Panicum americanum* and *P. cynosuroides*; and suggests appropriate restrictions for the names *Panicum alopecuroides*, *P. glaucum*, and *Holcus spicatus*. She believes that pearl millet furnishes a good example of the "Linnaean concept of species," so frequently urged by botanists who are not systematists.—*E. W. Sinnott.*

1087. COULTER, J. M. New genera. [Rev. of: (1) NAKAI, TAKENOSHIN. *Genus novum Oleacearum in Corea media inventum*. *Bot. Mag. Tôkyô* 33: 153-154. 1919 (see *Bot. Absts.* 5, Entry 2386); (2) PENNELL, F. W. A brief conspectus of the species of *Kneiffia*, with the characterization of a new allied genus. *Bull. Torrey Bot. Club.* 46: 363-373. 1919 (see *Bot. Absts.* 5, Entry 2390).] *Bot. Gaz.* 69: 96. 1920.

1088. DUMMER, R. A. A further contribution to our knowledge of the genus *Agathosma*, Willd., containing descriptions of 23 new species and 3 new varieties. *Ann. Bolus Herb.* 3: 44-62. 1920.—The new species and varieties, all from South Africa, described in the present paper are: *Agathosma humilis* Sond. var. *capitata*, *A. stilbeoides*, *A. Folejana*, *A. scaberula*, *A. krakadouwensis*, *A. tulbaghensis*, *A. decora*, *A. decora* var. *Buchu*, *A. decora* var. *pseudohybrida*, *A. Sonderiana*, *A. Marlothii*, *A. Keetii*, *A. perplexa*, *A. Pillansiana*, *A. craspedota* E. Mey. var. *eglandulosa*, *A. Pattisonae*, *A. utilis*, *A. mucronulata* Sond. var. *Rudolphii*, *A. Tugwelliae*, *A. Phillipsii*, *A. riversdalensis*, *A. formosissima*, *A. cedrimontana*, *A. Bodkinii*, *A. gracilipetala*, *A. bicolor*, *A. paludosa*, and *A. muizenbergensis* var. *planitiensis*.—*J. M. Greenman.*

1089. DUMMER, R. A. A note on, and a description of, four new species and two new varieties of the genus *Adenandra*, Willd. *Ann. Bolus Herb.* 3: 40-43. 1920.—The plants described in this article are all from the Cape Province of South Africa; they are: *Adenandra Fryii*, *A. caledonensis*, *A. viscida* E. & Z. var. *ciliata*, *A. Pottsii*, *A. biseriata* Meyer var. *gracilior*, and *A. Guthriei*.—*J. M. Greenman.*

1090. KUDO, YUSHUN. *Prunellopsis*, Labiatae genus novum. [*Prunellopsis*, new genus of Labiatae.] *Bot. Mag. Tôkyô* 34: 181-184. 1920.—A new genus, *Prunellopsis*, allied to *Prunella* and *Dracocephalum*, is described from Japan with one species, *P. prunelliformis* Kudo.—*Roxana Stinchfield Ferris.*

1091. MAIDEN, J. H. A critical revision of the genus *Eucalyptus*. Vol. V. Part 3. P. 71-101, pl. 176-179. William Applegate Gullick: Sydney, 1920.—The present part contains descriptions, critical notes, and illustrations of the following species: *E. ficifolia* F. v. M., *E. calophylla* R. Br., *E. hamaetoxylon* Maiden, *E. maculata* Hook., *E. Mooreana* (Fitzgerald) Maiden, *E. approximans* Maiden, and *E. Stowardi* Maiden.—*Ibid.* Part 4. P. 108-181, pl. 180-183. February, 1921. This part treats the following species: *Eucalyptus perfoliata*

R. Br., *E. pythocarpa* F. v. M., *E. similis* Maiden, *E. lirata* (Fitzgerald) Maiden n. sp., *E. Baileyana* F. v. M., *E. Lane-Poolei* Maiden, *E. Ewartiana* Maiden, *E. Bakeri* Maiden, *E. Jacksoni* Maiden, and *E. eremophila* Maiden.—*Ibid.* Part 5. P. 133-160, pl. 184-187. 1921. This part continues with a similar treatment of *Eucalyptus erythrocorys* F. v. M., *E. tetradonta* F. v. M., *E. odontocarpa* F. v. M., *E. capitellata* Smith, *E. Camfieldi* Maiden, *E. Blaxlandi* Maiden & Cambage, and *E. Normantonensis* Maiden & Cambage.—J. M. Greenman.

1092. MAIDEN, J. H. The forest flora of New South Wales. Vol. VII. Part 5. P. 193-237., pl. 224-247, 12 photographic illustrations. William Applegate Gullick: Sydney, 1920.—Six species are elaborated in this part, namely, *Archontophoenix Cunninghamiana* Wendl. & Drude, *Eucalyptus dumosa* A. Cunn., *Acacia rigens* A. Cunn., *A. Havilandi* Maiden, *Eremophila Mitchelli* F. v. M., and *E. Sturtii* R. Br. Each species is accompanied by a detailed description, one or more illustrations, and pertinent notes. An appendix contains a chapter on "Insects and Timber Trees."—J. M. Greenman.

1093. MIYOSHI, MANABU. Untersuchungen über japanische Kirschen, I. [Investigations of Japanese cherries, I.] Bot. Mag. Tōkyō 34: 159-177. 1920.—The synonymy and relationships of the true and false equinoctial cherries (species blooming at the spring equinox) are discussed. One new species, *Prunus sacra*, and numerous new forms are named and several new names are proposed.—Rozana Stinchfield Ferris.

1094. MIYOSHI, MANABU. Weitere Mitteilungen über die Hängekastanie. [Further contributions concerning the weeping chestnut.] Bot. Mag. Tōkyō 34: 185-183. 1920.—The author states that specimens of the weeping chestnut, *Castanea pubinervis* C. Schn. var. *pendula* Miyos., grown from seed show the characteristic weeping form, indicating that the variety is fixed. Additional distributional notes are given.—Rozana Stinchfield Ferris.

1095. PHILLIPS, E. P. The genus *Borbonia* Linn. (Leguminosae). South African Jour. Sci. 16: 397-410. Pl. 34-38, and map. 1920.—The author gives a synoptical revision of *Borbonia*, recognizing 15 species and several varieties. The following are described as new: *B. lanceolata* L. var. *robusta*, *B. lanceolata* L. var. *villosa*, *B. undulata* Thunb. var. *ciliata*, and *B. multiflora*.—J. M. Greenman.

1096. PHILLIPS, E. P. Three noteworthy species of plants from South Africa. South African Jour. Sci. 16: 429-431. Pl. 39. 1920.—Critical notes are recorded on *Protea rhodantha* Hook. f., *Kniphofia Northiae* Baker, and *Euphoria Monteiro* Hook. f.—J. M. Greenman.

1097. PILLANS, N. S. *Stapeliae*. Jour. Bot. Soc. South Africa 6: 5-6. 1920.

1098. WORDSWORTH, R., J. HUTCHINSON, F. BOLUS, AND L. BOLUS. Flowering plants collected in South-West Africa by the Percy Sladen Memorial Expedition, 1915-16. Ann. Bolus Herb. 3: 15-37. 1920.—An annotated list is presented of the flowering plants collected on the expedition mentioned in the title. No new species are recorded.—J. M. Greenman.

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, Editor

S. F. TRELEASE, Assistant Editor

1099. RAMÍREZ, ROMÁN. *Asclepiadea hulera*. [A rubber plant of the Asclepiadaceae.] Rev. Agric. [Mexico] 4: 508-509. 1 fig. 1919.—A brief description is given of *Cryptostegia madagascariensis*, a plant yielding low-grade rubber.—John A. Stevenson.

1100. STRAND, E. [Rev. of: SCHMIDT, H. Geschichte der Entwicklungslehre. (History of the theory of development.) 549 p. Alfred Kröner: Leipzig, 1918.] Arch. Naturgesch. Abt. A. 86: 184. 1920 [1921].—The author presents a consideration of the history of the evolutionary concept; its bearing on cosmology, chemistry, geology, and anthropology, as well as on biology; its relation to the theory of special creation; and its effect upon philosophical thought.—C. E. Allen.

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No. 3

ENTRIES 1101-1683

AGRONOMY

C. V. PIPER, *Editor*

MARY R. BURR, *Assistant Editor*

(See also in this issue Entries 1160, 1324, 1333, 1338, 1386, 1428, 1472, 1558, 1560, 1571, 1611, 1619, 1620, 1621, 1645, 1666, 1677, 1682.)

1101. ANONYMOUS. Bureau of Sugar Experiment Stations Annual Rept. II. 20th Annual Report of the Bureau of Sugar Experiment Stations. 1920. Australian Sugar Jour. 12: 651-655. 1921.—The report covers the period to the end of Oct., 1920.—Experiments with subsoiling as compared with ordinary farm cultivation for sugar cane gave results in favor of subsoiling. Results of experiments on 3 crops subsoiled showed an increase of 9.8 tons of cane and 1.53 tons of cane sugar over the amount obtained from 3 crops with ordinary cultivation. With regard to varieties of the Queensland seedlings planted last year at the Mackay Station, Q. 813 and Q. 1092 germinate and grow quickly, while Q. 970, H. Q. 458, and Q. 1121 are fairly good; Q. 1098 is a later-maturing variety.—*E. K. Tisdale.*

1102. ANONYMOUS. Crop rotation and mixed farming. (Summary of lecture by the Chief Agriculturist to the Midlands Farmers Association.) Rhodesia Agric. Jour. 18: 167-173. 4 pl. 1921.—Attention is called to the fact that a system of crop rotations must be established in Rhodesia before permanent agricultural stability can be achieved.—*E. M. Doidge.*

1103. ANONYMOUS. Field Assistant's Report. Extract from Murray, J. C. Bureau of Sugar Experiment Stations Annual Report II. 20th Annual Report of the Bureau of Sugar Experiment Stations. 1920. Australian Sugar Jour. 12: 655-657. 1921.—The report deals with the growth of varieties of sugar cane in the Cairns District of Australia. Badila has given the most satisfactory results; Green Goru (24B) grows well. A small quantity of "Pompey" recently introduced by the C. R. S. Co. is promising, judging by its healthy erect appearance and vigorous stool. Shahjahanpur is doing well. This variety is a good striker, has a good root system, stools well, grows in an erect manner, has a high sugar content, and a high resistance to frost.—*E. K. Tisdale.*

1104. ANONYMOUS. Le soja. [Soybeans.] Bull. Agric. Congo Belge 11: 151-186. Fig. 23-32. 1920. In the cotton and maize-growing districts soybean is the best annual legume to cultivate, being a fodder plant of great value. The food value of the hay and beans and the methods of cultivating and harvesting the crop are discussed. It is recommended that for hay soybeans and cowpeas be planted together.—*E. M. Doidge.*

1105. ANONYMOUS. Potato Majestic. Gard. Chron. 69: 129. Fig. 57. 1921.—This is a comparatively new variety, popular, a heavy yielder, white, and immune to the wart disease. It often yields 34 tons per acre. The heaviest tuber weighed 11 pounds and 15 ounces.—*P. L. Ricker.*

1106. ANONYMOUS. School experiment plots at Yass. Agric. Gaz. New South Wales 32: 342. 1921.—This is a brief note on cereal trials conducted at Yass.—*L. R. Waldron.*

1107. ANNETT, H. E. Some experience with poppy growers in the United Provinces. Agric. Jour. India 16: 19-23. 1921.—ANNETT having found that the opium obtained from successive lancings of poppy capsules at intervals of 2 or 3 days showed a progressive decrease in morphine content, the Government of Bengal offered a reward to cultivators bringing opium in 2 portions, one the product of the 1st lancings, the other that of successive lancings. Two years' experience showed that the opium purporting to represent the 1st lancings was lower in morphine than there was reason to expect. An investigation showed that only 54 per cent of the cultivators lived up to their obligations, the remainder through dishonesty or carelessness having failed to keep separate the opium from the 1st lancings.—*W. W. Stockberger.*

1108. BIEREI. Die Bedeutung der Gründüngung im landwirtschaftlichen Betriebe im Allgemeinen und für den Kartoffelbau im Besonderen. [The importance of green manuring in the system of agriculture in general and for potato culture in particular.] Illus. Landw. Zeitg. 41: 67-68. 1921.—Green manuring is considered indispensable for the increase in yields of potatoes. Depending on environmental conditions and the character of soil, green manuring may be introduced in the rotation either as a main crop, or as a stubble crop, or as an undercrop. The same conditions should determine the selection of the legume to be sown. Lupine, serradella (for lighter soils), and yellow clover (for heavier soils) are considered among the most important.—*M. Shapovalov.*

1109. BLAIR, A. W., AND B. E. BROWN. The influence of fertilizers containing borax on the yield of potatoes and corn. Season 1920. Soil Sci. 11: 369-383. Pl. 1-4. 1921.—Borax in quantities from 1 to 400 pounds per acre and mixed with a fertilizer containing cottonseed meal, acid phosphate, and muriate of potash was applied to corn and potatoes in 3 ways. The borax was drilled in the furrow 2 or 3 weeks before planting, drilled in at the time of planting, or broadcast at the time of planting. For potatoes with the 1st method 50 pounds of borax per acre had little or no effect; 100 pounds reduced the yield $\frac{1}{2}$; and 400 pounds produced a failure. With the 2nd method 30 pounds caused a drop in yield and 50 pounds reduced it to $\frac{1}{3}$. With the 3rd method 50 pounds decreased the yield slightly. For corn with the 1st method germination was reduced with 20 pounds per acre, as little as 5 or 10 pounds reducing it with the 2nd and 3rd methods. Using the 1st method a depression of yield was produced by 100 pounds per acre but none by 50 pounds; with the 2nd and 3rd methods 50 pounds reduced the yield to $\frac{1}{3}$.—*W. J. Robbins.*

1110. BREAKWELL, E. Progress report on farmers' grass plots. Agric. Gaz. New South Wales 32: 364. 1921.—Brief notes are given on *Phalaris bulbosa*, *Pennisetum longistylum*, and on other grasses of lesser importance grown at Dorriggo and Hargreaves.—*L. R. Waldron.*

1111. BRESSEL, KURT. Erfahrungen im Anbau von Frühkartoffeln in der Börde. [Experiences in raising early potatoes.] Illus. Landw. Zeitg. 41: 75. 1921.—The advisability of changing seed potatoes annually, or at least bi-ennially, is emphasized, and a few suggestions as to their care and culture are given.—*M. Shapovalov.*

1112. CHUNG, H. L. Report of the Agronomy Division. Hawaii Agric. Exp. Sta. Rept. 1919: 44-49. Pl. 5-6. 1920.—Guam and Cuban corn varieties have been under test, producing respectively 52.5 and 30.4 bushels per acre; both are resistant to the leaf hopper. An interesting mutant in Early Refugee beans is noted. Reports on experimental work with sweet potatoes, field turnips, dryland taro, pigeon peas, cassava, edible canna, field beets, field carrots, Irish potatoes, annual white sweet clover, alfalfa, and various grasses are included.—*J. M. Westgate.*

1113. COMPTON, R. H., AND J. W. MATHEWS. The cultivation of buchu. Jour. Dept. Agric. South Africa 2: 223-228. 3 fig. 1921.—The climate of the winter-rain belt is naturally suited to the requirements of buchu; the plant is propagated by seed and "dry" cultivation is practiced. Directions are given for harvesting and marketing buchu, and the yield of resin and oil from various species of *Barosma* is compared.—E. M. Doidge.

1114. CZUBER, E. Beziehung zwischen Parzellengrösse und Fehler der Einzelbeobachtung bei Feldversuchen. [Relation between size of plats and error in detached observations in field experiments.] Zeitschr. Landw. Versuchsw. Deutschösterreich 23: 61-68. 1920.—The results of a series of plat experiments, in which the yields of rye, oats, potatoes, and rape were reported upon by W. VAGELER in Jour. Landw. for 1919, page 97, are discussed. The present writer takes Vageler's data and by a different mathematical treatment obtains different results for the ratio of percentage of error to size of plats. His methods are given in detail.—John W. Roberts.

1115. DOWNING, R. G. Trials of canary seed. Agric. Gaz. New South Wales 32: 308. 1921.—Trials were conducted with *Phalaris canariensis* (?) on 4 experimental farms with fairly satisfactory results. At Cowra 730 pounds of seed per acre were secured.—L. R. Waldron.

1116. ECKENBRECHER, C. Anbauversuche der Deutschen Kartoffel-Kultur-Station im Jahre 1920. [Cultural studies of the German potato-culture station in 1920.] Illus. Landw. Zeitg. 41: 74-75. With colored pl. 1921.—German varieties of potatoes (21) were studied with respect to tuber yields, starch content, and starch yields. The highest tuber-yielding variety (Blücher) appeared to be also the highest starch-yielding variety and, in general, a great deal more parallelism exists between the high total yields and the high starch yields than between either of these 2 and the starch content.—M. Shapovalov.

1117. GALANG, F. G. Yam culture. Philippine Agric. Rev. 13: 63-72. Pl. 3. 1920.—Cultural directions and yield data are given for various species of *Dioscorea*, especially *D. alata* and *D. esculenta* (*D. aculeata*).—E. D. Merrill.

1118. GAYLORD, F. C. More and better potatoes. Proc. Amer. Soc. Hort. Sci. 17: 99-102. 1920 [1921].—Striking results have been obtained following an organized effort in Indiana to demonstrate to the growers the best methods of handling the potato crop. The average increase in production in 1919 of 12 demonstration fields was about 25 per cent.—H. A. Jones.

1119. GHESQUIERE, JEAN. Rapport concernant les machines pour la traitement des semences de coton contre les teignes. [Report on machinery for the treatment of cotton seed against moths.] Bull. Agric. Congo Belge 11: 147-150. 1920.

1120. GOFF, R. A. Report of the Glenwood Substation. Hawaii Agric. Exp. Sta. Rept. 1919: 68-73. 1920.—At the Glenwood Substation experiments were conducted with Irish potatoes, sweet potatoes, Maui red beans, dryland taro, licorice roots, poha (*Physalis* spp.), alfalfa, sweet clover, corn sorghum, edible canna, cassava, pigeon peas, and grasses.—J. M. Westgate.

1121. HEINZE, B. Der erfolgreiche Anbau der Oelbohne in unserem eigenen Lande. [The successful cultivation of the soybean in our own land.] Illus. Landw. Zeitg. 41: 59-60. 1921.—The author calls attention to the importance of the soybean as a food for man and animals and argues for the possibility of its successful culture in Germany.—John W. Roberts.

1122. HILTNER, L. Über die Impfung der Futter- und Zuckerrüben. [Inoculation of feed and sugar beets.] Mitteil. Deutsch. Landw. Ges. 36: 243. 1921.—A brief discussion is presented of the conclusions reached concerning the value of some German bacterial preparations to non-leguminous plants, with special reference to an inoculating material obtained from soils exceptionally well adapted to the growing of beets. In very limited experiments beets

treated with this preparation produced crops exceeding those from the untreated plots by as much as 26.7 per cent. It is stated that the treatment of non-legumes with cultures of bacteria is still in the experimental stage.—*Lewis T. Leonard.*

1123. ISIDRO, R. A. Comparative culture of upland and lowland rice with special reference to cost of production and distribution of income. *Philippine Agric.* 8: 213-233. 1920.—The general conclusions are that lowland culture gives a higher yield than upland culture, but the cost per unit area is higher.—*E. D. Merrill.*

1124. K [ENOYER], L. A. [Rev. of: CHILCOTT, E. C., AND JOHN S. COLE. Sub-soiling, deep tilling and soil dynamiting in the Great Plains. *Jour. Agric. Res.* 14: 481-521. 1918.] *Jour. Indian Bot.* 2: 92. 1921.

1125. KIESSELBACH, T. A., AND F. D. KEIM. The regional adaptation of corn in Nebraska. *Nebraska Agric. Exp. Sta. Res. Bull.* 19. 64 p., 13 fig. 1921.—The general morphological characters of the plant and the histological structure of the leaf were studied for corn types known to be acclimated to various regional areas of Nebraska. Adaptation of corn to divergent climatic conditions consists in a morphological rather than in a histological reaction. While some of the vegetative characters, such as total leaf area and plant weight, may differ as much as 300 per cent, in the case of native types growing in the more adverse as compared with the most favored parts of the state, no important histological leaf characters exhibited a difference of more than 15 per cent.—The actual hereditary difference (apart from environmental effects) between types adapted to favorable and to unfavorable climatic conditions may be brought out by comparing both in the same environment under favorable conditions. When eastern and western Nebraska corn were grown comparably at the Nebraska Experiment Station in Lancaster County, western Nebraska corn was much reduced in plant size, leaf area, and dry matter. Plants from seed of both sources were rather similar as to leaf thickness, epidermal and cuticular thickness, relative number of vascular bundles, number of stomata per unit leaf area, and size of stomata. It is concluded that adaptation of corn to a region of moisture shortage consists chiefly in the reduction of vegetative development and consequent reduction in the amount of water used by the individual plant. Comparative yield tests of corn from various sources indicate that, in general, native seed is superior to imported seed, though it is possible to introduce seed from a distance which gives entirely satisfactory results.—*T. A. Kieselbach.*

1126. KOCH, PIETER. Curing of Turkish tobacco. *Jour. Dept. Agric. Union of South Africa* 2: 409-421. *Fig. 1-7.* 1921.—The author discusses the best methods of handling Turkish tobacco in the Western Province of South Africa. Ripening, harvesting, and curing are treated in separate paragraphs. There are 3 stages of curing: 1st, wilting in a wilting room; 2nd, drying in the sun; and 3rd, fermentation. Each stage is described in detail.—*E. M. Doidge.*

1127. KRAUSS, F. G. Report of the Extension Division. *Hawaii Agric. Exp. Sta. Rept.* 1919: 56-67. *Pl. 9-10.* 1920.—At the Haiku Demonstration and Experimental Farm variety tests and breeding work with numerous varieties of diversified crops were conducted. One thousand acres of pigeon peas were planted as a result of the Haiku demonstrations.—*J. M. Westgate.*

1128. LANG, E. Die betriebswirtschaftliche Stellung des Kartoffelbaues unter den gegenwärtigen Verhältnissen. [Economic organization of the potato industry under present conditions.] *Illus. Landw. Zeitg.* 41: 65-67. 1921.—Owing to the impossibility of increasing the area for potato culture, it is imperative to produce more on a given area. In this connection, the importance of extensive use of farm machinery, better organization and utilization of labor, proper fertilization, and the use of good seed are discussed.—*M. Shapovalov.*

1129. LANSDELL, K. A. A South African gum. (*Combretum erythrophyllum* Burch.) Jour. Dept. Agric. Union of South Africa 1: 834-837. 1920.—This plant, growing in the neighborhood of Pretoria, produces a gum which promises to be as valuable in tanning as Gum Tragacanth. Description of the tree with illustrations and copy of a report on the gum by the Imperial Institute are given.—*E. M. Doidge*.

1130. LANSDELL, K. A. *Pappea capensis* seed. Jour. Dept. Agric. Union of South Africa 1: 760-764. 1 pl. 1920.—It was found that whole seed of *Pappea capensis* yield 47.8 per cent of oil and the decorticated kernels 73.5 per cent. The oil is of a non-drying type suitable for soap making or use as a lubricant. The chemical analysis of the meal after the oil is expressed shows a slight inferiority to cotton seed meal. No feeding tests of the meal were conducted. An illustration and description of the plant are given.—*E. M. Doidge*.

1131. LEPLAE, E. La culture du coton au Congo belge (1915-1919). [Cotton culture in Belgian Congo, 1915-1919.] Bull. Agric. Congo Belge 11: 80-106. Fig. 19-22. 1920.—This is an account of the establishment and extension of cotton culture during the period under review. The natives of Maniema, Sankuru, and Kasai have adopted cotton as a staple crop; the sale of cotton produces a considerable revenue and the acreage under cotton increases rapidly. The natives planted 45 hectares in 1916, 800 in 1917, 1000 in 1918, and 2000 in 1920. Of the varieties tested Triumph Big Boll and Simpkins have given the best results.—*E. M. Doidge*.

1132. MAINWAIRING, C. Maize for export, with notes on grades and grading. Rhodesia Agric. Jour. 18: 174-178. 1 fig. 1921.—Grades for export maize in the Union of South Africa, Portuguese East Africa, and Southern Rhodesia are given. Special advice is given as to condition and quality of bags, and general advice with reference to exporting.—*E. M. Doidge*.

1133. MASON, T. G. Nep. Agric. News [Barbados] 20: 22. 1921.—After tracing the life history of the lint hair, as given by BALLS, the author concludes that the prospects of reducing "nepiness" are not promising under ordinary conditions, the only feasible suggestion being that of growing a strain of cotton similar to that isolated in St. Vincent by Dr. HARLAND, and characterized by a low rate of boll-shedding. If this were planted so that maximum boll-production occurred in the drier months, the deposit of secondary cellulose might be expected to proceed uniformly. Success would seem to depend on the recognition and elimination of strains forming an abnormal number of flabby fibers.—*J. S. Dash*.

1134. MASON, T. G. The water factor in crop production. Agric. News [Barbados] 19: 355. 1921.—The 2 main points discussed by the author are (1) selecting plants adapted to local conditions, and (2) adjusting the water factor of the environment to the needs of the plant. Certain cultural methods are referred to,—dust mulch, the use of a trash mulch for sugarcane, and wider spacing of certain crops, such as maize.—*J. S. Dash*.

1135. MELLE, HENRY A., AND SYDNEY M. STENT. Fodder and pasture grasses of South Africa. 1. Sudan grass. (*Sorghum sudanense* Stapf.) Jour. Dept. Agric. Union of South Africa 2: 425-433. 4 fig. 1921.—Sudan grass is closely related to the kafir, broom, and sweet sorghums, but yields superior hay; 3 or 4 cuttings can be obtained under favorable conditions. The yields vary from 2 to 8 tons of hay per acre. Sudan grass grows well in districts suitable for kafir corn and is recommended for cultivation in areas where it is too hot and dry for the successful growing of teff.—*E. M. Doidge*.

1136. MÜNTER, F. Sonnenblumen und Helianthi und Mais als Silagemasse. [Sunflowers, Helianthi, and maize as silage.] Illus. Landw. Zeitg. 41: 44. 1921.—The author reports chemical analyses of dried sunflower, Helianthi, and maize at various stages in their development. The Helianthi were highest in albumen content, but the latter decreased in all the plants as they approached maturity. When the Helianthi are harvested late for silage they should be mixed with leguminous plants. In general, the sunflowers should be cut at any time between

the beginning of full bloom and seed in the "milk" stage. Maize should be harvested shortly before the grains are mature, because of the increase in nitrogen-free extracts and fats at that stage.—*John W. Roberts.*

1137. PAGUIRIGAN, D. B. Tobacco growing in the Philippines. Bur. Agric. Philippine Islands Bull. 34. 26 p., 9 pl. 1919.—A popular treatise on the subject with special reference to Philippine conditions.—*E. D. Merrill.*

1138. PARISH, E. Wheat and its cultivation. Jour. Dept. Agric. Union of South Africa 2: 322-332. 1921.—Extracts are presented from Bull. 22, Dept. Agric. Victoria, Australia, with notes concerning the applicability of wheat growing in South Africa, with special reference to the southwestern wheat areas of the Cape.—*E. M. Doidge.*

1139. PATE, W. F., AND R. Y. WINTERS. Spacing cotton on North Carolina soils. North Carolina Agric. Ext. Serv. Circ. 112. 7 p. 1921.—Tests extending over a series of years show that best yields of cotton in several localities of North Carolina were secured from 3½-foot rows with 16 inches—in 1 locality 12—between hills.—*F. A. Wolf.*

1140. PETHYBRIDGE, GEORGE H. Is it possible to distinguish the seeds of wild white clover from those of ordinary white clover by chemical means during a germination test. Econ. Proc. Roy. Dublin Soc. 2: 248-258. 1919.—As the seed obtained from wild white clover produces much longer-lived stands than that obtained from cultivated white clover and commands a higher price, an effort was made to determine whether adulteration of the former with the latter could be detected. Seedlings from wild stock from different sources were found generally to give off HCN in sufficient quantity for detection by the picric acid test; those from ordinary stock obtained from England generally gave off much less or none at all. However, some of the ordinary clover seed imported from Canada and America gave off HCN in germinating, making the HCN test of value chiefly where negative results were obtained, indicating adulteration with acyanophoric ordinary seed; and of little value where the wild seed is adulterated with cyanophoric American or Canadian ordinary seed.—*Charles Drechsler.*

1141. RASMUSSEN, H. J. Fodringsspørgsmaalet. [Questions on feeding.] Tidsskr. Landokonomi 1921⁴: 142-162. 1921.—A lecture in which Danish farmers are urged (1) to raise more feed at home, especially timothy and alfalfa, so as to eliminate as far as possible the importation of animal feed; (2) to build silos and feed ensilage in the same manner as American farmers. The results of feeding experiments by ARMSBY of the Pennsylvania State College are quoted.—*Albert A. Hansen.*

1142. ROSENFELD, ARTHUR H. Saving money with frozen cane. Internat. Sugar Jour. 23: 316-319. 1921.—After a killing freeze in northern Argentina, the frozen cane was used as a mulch between alternate rows of 1st-year stubble,—following the principle of using trash in the Cuban cane fields; a saving of labor and money resulted. In the unirrigated sections, the mulched fields produced slightly better yields than the regularly cultivated ones.—*C. Rumbold.*

1143. RÜMKER, UND R. LEIDNER. Sommerweizenanbauversuche. [Culture experiments with summer wheat.] Illus. Landw. Zeitg. 41: 58-59. 1921.—A report is presented of plot experiments for the testing of different varieties in Bornstedt (1919) and Emersleben (1920). The results are given in tabular form and include time of heading, time of blooming, resistance to rust and smut, length and thickness of heads, color of grains, weight of 100 grains, and yield.—*John W. Roberts.*

1144. SHEPHERD, A. N. Farmers' experiment plots. Potato trials, 1920. Murrumbidgee irrigation areas. Agric. Gaz. New South Wales 32: 309-312. 1921.—Four settlers cooperated in conducting trials, 7 varieties being grown. Up-to-Date produced the largest yields. Mineral fertilizers increased the net returns, in one case by \$140 per acre.—*L. R. Waldron.*

1145. SNELL, KARL. Das Kartoffelsorten Archiv des Forschungs-Institutes für Kartoffelbau. [Potato-variety records of the institute for investigations in potato culture.] Illus. Landw. Zeitg. 41: 74. 1 colored pl., 1 fig. 1921.—A system of photographic records of characteristic features of various varieties has been perfected and gives very satisfactory results as a substitute for fresh specimens.—M. Shapovalov.

1146. STÜMPFEL, E. Verdoppelung der Kartoffelernten durch starke Stickstoffdüngung. [Doubling potato yields by heavy nitrogenous fertilization.] Illus. Landw. Zeitg. 41: 69. 1921.—Attention is drawn to the advantages of using commercial fertilizers and lime for potato fields.—M. Shapovalov.

1147. THOMPSON, O. A. Twelfth to eighteenth annual reports Edgeley Sub-station, 1914-1920. North Dakota Agric. Exp. Sta. Bull. 145. 44 p., 1 fig. 1921.—Yields are presented of 24 varieties of spring wheat for 1908-1916 and for 10 varieties for 1920. The 1920 yields varied greatly due to attacks of stem rust. The new rust-resistant variety of common wheat, Kota, greatly outyielded all other common varieties and was exceeded only by Monad, Acme, and "D-5,"—rust-resistant durums. Flax variety yields are given for 1912-1916; but little variation is shown. The oat variety Siberian White, and the barley variety Oderbrucker, have been consistent high yielders.—In a comparative trial of forage crops extending over 12 years, brome-grass (*Bromus inermis*) yielded on an average 1.36 tons, alfalfa 1.04 tons, common red clover 0.58 tons, and maize 1.98 tons per acre. Foxtail millets yielded an annual average of about 2.5 tons of hay for 5 years. Notes are given on field peas, sweet clover, slender wheat-grass (*Agropyron tenerum*), and rape.—Early Ohio and Early Six Weeks are said to be the best-yielding potato varieties. Notes are given on potato culture.—In a trial covering 6 years, oats were seeded at 10 different rates, from 3 to 12 pecks per acre. The highest net yield was secured from the 8-peck rate. In a similar trial with barley the 6-peck rate gave the highest net yield. Similar trials were conducted for both common and durum wheats for a period of 7 years with rates from 2 to 11 pecks per acre. With durum wheat the largest net yield was secured from the 7-peck rate, closely approached by that of the 5-peck rate. With common wheat the largest net yield resulted from sowing 8 pecks per acre, but seedings of 5, 6, and 7 pecks gave only slightly lower yields.—Early fall plowing produced better yields in continuous wheat culture trials than later fall plowing. All spring methods, on the average, outyielded all the fall methods, in preparing ground for continuous wheat culture, by 3.2 bushels per acre.—In continuous cropping experiments with common and durum wheats, oats, and barley, plowing 6 inches deep gave yields as good or better than those secured from 6-inch plowing accompanied by subsoiling alone or subsoiling and packing. Subsoiling was done every 4th year.—Yields of grain are given for wheat, oats, and barley, and fodder of maize when grown under methods of (1) continuous cropping and (2) alternate cropping with clean summer tillage. Yields of wheat were increased by 14 per cent under alternate clean summer tillage. Increased barley yield was but slightly better on the clean summer tillage. Yields of oats were increased 52 per cent by alternate tillage. An absolute loss of maize fodder resulted when grown on clean summer tillage, the cleanly cultivated soil seeming to have an inhibitory effect upon maize yields.—When wheat or oats followed fallow in a rotation the increase in yield, compared with that secured from these crops following small grain in rotation, was not over 20 per cent.—Averaging the results of 13 years, little or no advantage was secured in plowing under a green manure crop of winter rye, field peas, or sweet clover preparatory to growing wheat or oats, in comparison to the same crops grown after clean summer fallow. In a 4-year rotation where wheat followed a clean-cultivated, manured summer fallow, the increase in yields of wheat compared with unmanured trials was 1.8 bushels per acre, or 11 per cent. The increased yield of fodder of the succeeding maize crop was 877 pounds, or 25 per cent, and the increase in yield of the next succeeding oat crop 8.2 bushels, or 24 per cent. In similar rotations, in which, however, oats followed manured fallow, the increases in yield were: Oats, 1.3 bushels, or 3 per cent; maize fodder, 967 pounds, or 28 per cent; and wheat, 1.7 bushels, or 10 per cent. These results are the averages of 12 years.—In a series of 3-year rotations, wheat and barley yielded more following maize than when following clean summer tillage (average of 14 years' results). Oats yielded 4.9 bushels, or 12

per cent, more after fallow than after maize. As an average of results for 13 years, oats following small grain yielded 4.9 bushels, or 13 per cent, more than when following sod crops,—alfalfa, smooth brome-grass, and clover; the lowest yield followed alfalfa. Wheat, oats, and barley following maize yielded more than when following small grains.—In a comparison of disking versus plowing maize ground as a preparation for wheat and oats, the results for an average of 14 years were slightly in favor of the disked ground.—In fertilizer experiments with wheat, oats, barley, and maize, using manure and mineral fertilizers, distinct positive results were secured only with maize. Progress data are presented upon experiments designed to maintain soil productivity on the Edgeley loam.—Notes are given on suitable trees and methods of tree planting, especially with relation to farmsteads. Suitable varieties of apples, plums, and small fruits are indicated.—*L. R. Waldron.*

1148. WALTERS, J. A. T. Winter wheat. Results of co-operative experiments 1921. Rhodesia Agric. Jour. 18: 181-183. 1 pl. 1921.—A summary is presented of reports of experiments with 4 varieties of winter wheat, namely, Early Gluyas, Florence, Black Persian, and Yellow Cross; results are given for both irrigated and unirrigated lands.—*E. M. Doidge.*

1149. WESTER, P. J. Cultural directions for field crops and vegetables. Philippine Agric. Rev. 13: 80-88. Pl. 1-7. 1920.—Brief notes are given on the general cultivation of vegetables and field crops, such as ragi, rape, sembu, and sunflowers, with tabulated directions for planting.—*E. D. Merrill.*

1150. WESTER, P. J. Notes on adlay. Philippine Agric. Rev. 13: 217-222. Pl. 1-4. 1920.—The author strongly urges the more extensive cultivation and utilization of *Coix lachrymajobi* Linn. var. *mayuen* Stapf, a variety of the common Job's tears with soft, thin, involucre instead of the very hard one in the typical form. This has been cultivated for many centuries by the more backward peoples in the Indo-Malayan region.—*E. D. Merrill.*

1151. WHITTET, J. N. A promising introduction. Kikuyu grass (*Pennisetum longistylum* Hochst.). Agric. Gaz. New South Wales 32: 313-322. 5 fig. 1921.—Reports from 10 experiments with this grass are briefly stated. The grass holds out much promise for Australian conditions. Cultural notes and an analysis are given. A test shows the grass to be favorable for milk production.—In a palatability test with 14 grass species, Kikuyu grass ranked 3rd, *Bromus inermis* 1st, *Phleum pratense* 6th, *Poa pratensis* 7th, and *Bouteloua oligostachya* 13th.—*L. R. Waldron.*

1152. WILLIAMS, C. B. I. Fertilizers for crops commonly grown in North Carolina. Bull. North Carolina Dept. Agric. 1921: 13 p. May, 1921.—Recommendations are given of the kind and amount of commercial fertilizer to be used for cotton, cereals, tobacco, and leguminous crops in the coastal plain, Piedmont, and mountain sections of North Carolina.—*F. A. Wolf.*

1153. WILLIAMS, C. B. Report of the Division of Agronomy. Ann. Rept. North Carolina Agric. Exp. Sta. 43: 15-31. 1920 [1921].—A general statement is presented covering the investigations in soil fertility at the several test farms, tests with nitrate of soda on cotton in the Piedmont section, fertilizer tests with wheat in the mountain section, and results of seed selection with soybean, cotton, wheat, and corn.—*F. A. Wolf.*

1154. ZIELSTORFF, W. Über Haferdüngungsversuche mit fallenden Phosphorsäuregaben. [Fertilizer experiments on oats, using decreasing quantities of phosphoric acid.] Mittell. Deutsch. Landw. Ges. 36: 213-215. 1921.—Field experiments were carried out at Polenshof and Ludwigswalde; also pot experiments with soils from these fields. Though neither field reacted in any way to phosphoric acid, a decided need for this ingredient was shown in the pot experiments; this may have been due to a deficiency in rainfall during the summer months. There was also lack of agreement between the field and pot experiments as regards potash, for which no explanation appears. Further experiments are necessary to furnish an explanation.—*Albert R. Merz.*

1155. ZOOK, L. L. Winter wheat seed-bed preparation. Nebraska Agric. Exp. Sta. Bull. 178. 16 p., 1 fig. 1921.—Results are reported from the North Platte Nebraska Exp. Substa. secured during 8 years, 1912-1919, from packed and unpacked soil plowed at various depths. On 4 plats plowed at each of 4 depths (3, 7, 10, and 14 inches) for 8 years: (1) The highest yields were secured from the intermediate depths of plowing; (2) the lowest average yield was secured from plowing 3 inches deep; (3) the increase in yield from 7-inch plowing over that secured from 3-inch plowing was sufficient to justify plowing at the greater depth; (4) the yields from plowing 7 and 10 inches deep were practically the same,—no advantage was gained from plowing at a depth greater than 7 inches; (5) the 14-inch, or very deep, plowing produced the lowest yields of any except the 3-inch plowing; (6) the depth of plowing had no appreciable effect upon the storage or use of soil moisture; (7) higher yields were secured from early than from late fall plowing, but the differences were not great; (8) better yields followed packing. Deep tillage experiments conducted by the U. S. Dept. Agric. in 12 states showed the practice to be unprofitable at all stations.—T. A. Kiesselbach.

BIBLIOGRAPHY, BIOGRAPHY, AND HISTORY

NEIL E. STEVENS, *Editor*

(See also in this issue Entries 1244, 1280, 1281, 1311, 1447, 1592, 1606, 1683)

1156. ANONYMOUS. In commemoration of the centenary of the birth of Sir William Macleay. Proc. Linn. Soc. New South Wales 45: 218-219. 1920.—William Macleay (1820-1891) came to Australia in 1839 with his cousin, William Sharp Macleay (1792-1865). In memory of the scientific usefulness and influence of the family, exhibits of relics and portraits were shown and memorials prepared. The Macleay collections are now in the possession of the University of Sydney.—*Eloise Gerry*.

1157. ANONYMOUS. John Goodyer and Lobel. Gard. Chron. 69: 157-158. 1921.—Manuscripts were exhibited by Dr. R. T. GÜNTHER at a recent meeting of the Linnean Society of London which were bequeathed to Magdalen College by John Goodyer with his botanical library in 1664. These include his own translations of Theophrastus and Dioscorides, the latter said to have never been undertaken by any other scholar. One volume contains a long list of grasses with synonyms and short descriptions copied from Lobel's MSS. (now lost?); an index of plants in Goodyer's hand, an index to Gerard's Herbal (1597) and Stonehouse's Catalogue of plants in his garden at Darfield in 1640. The loose papers comprise part of the MS. for Lobel's projected *Stirpium Illustrationes*, now bound in 3 parts, the 1st containing descriptions of 223 species of grasses. Selections from this by How were printed in 1655. Two other volumes contain synonyms of plants used by Goodyer, and a small fern and moss collection. The miscellaneous papers include dated descriptions by Goodyer of some 90 new or rare species, and lists of plants from the gardens of William Coys in Essex in 1616. Goodyer's notes also show that Mr. "Coel," Lobel's son-in-law, was identical with Master James Cole, London merchant, mentioned by Gerard. Lobel had another son-in-law, Ludovicus Myreus, a London apothecary referred to by Clusius in his *Exotica*.—P. L. Ricker.

1158. ANONYMOUS. Mr. Joseph Cheal, V. M. H. Gard. Chron. 69: 170. *Portrait*. 1921.—Cheal is specially interested in fruit growing and is a leading spirit in the National Dahlia Society.—P. L. Ricker.

1159. ANONYMOUS. Mr. Kingdon Ward. Gard. Chron. 69: 122. *Portrait*. 1921.—A brief notice is presented of Ward's work as botanical explorer in China and announcement of a new expedition to Szechuan and Yunnan.—P. L. Ricker.

1160. ANONYMOUS. Origin of the Uba cane. Noel Deerr's opinion versus local account. South African Sugar Jour. 5: 187, 189. 1921.—Deerr's article (see Bot. Absts. 8, Entry 16), which is here quoted entire, concludes that the Uba came to Natal, by way of Mauritius, from

Brazil, whence it received its name from "Vuba," used in Brazil for sugar cane as early as 1650; but the local story reaffirms its Indian origin. About 30 years ago sugar cane varieties from Egypt, Louisiana, Mauritius, West Indies, and India were planted on the Reunion estate of Mr. de Pass, near Durban, Natal. The last box to arrive was left underneath the bins in the mill until the tops were almost dead, but, when planted, 2 of them grew and flourished, and eventually a variety was clearly established. On the label attached to the cane tops only 3 letters could be found, which were deciphered as "Uba," but there was no doubt that these tops came from Poona, and it is assumed that the last letters of this word were misread as "Uba." This is the local account as given by George Wade, overseer of the mill, 5 years after the finding of the cane tops.—*E. K. Tisdale*.

1161. ANONYMOUS. Sir Frederick W. Moore, V. M. H. *Gard. Chron.* 69: 158. *Portrait*. 1921.—A biographical sketch is given of the keeper of the Royal Botanical Gardens, Glasnevin, Dublin, in which position he was preceded by his father, David Moore, who took charge in 1835 and held the position for 41 years. The son has now been there 41½ years.—*P. L. Ricker*.

1162. ANONYMOUS. The drug business in Colonial times. *Pharm. Era* 53: 199-200. 1920.—Gleanings from newspaper advertisements of the 18th century, with reproduction of one by G. Duykinck of New York, August 3, 1769.—*Neil E. Stevens*.

1163. ARBER, AGNES. Plants and flowers in Chinese poetry. *Gard. Chron.* 69: 163. 1921.—References are given to recent translations of Chinese poetry by H. A. Giles (1898) and A. D. Waley (1918 and 1919).—*P. L. Ricker*.

1164. BEILLE, LUCIEN. Un botaniste bordelais. Léonce Motelay 1830-1917. [Léonce Motelay, 1830-1917, a Bordelais botanist.] *Actes Soc. Linn. Bordeaux* 70: 493-509. *Portrait*. 1917-18 [1920?].—Motelay was a member of the Linnean Society of Bordeaux for more than 60 years and contributed many papers to its publications, the monograph of *Isoëtes* by Motelay and Vendries, presented in 1879, being of special note. His herbarium, consisting of a general collection and flora of the Gironde, was presented to the city of Bordeaux in 1906.—*M. F. Warner*.

1165. BIERS, PAUL. L'herbier tricolore de Bory de Saint-Vincent. [The tricolored herbarium of Bory de Saint-Vincent.] *Bull. Mus. Hist. Nat. Paris* 26: 429-431. 1920.—The tradition that Bory, like Bosc and other liberal botanists, used red, white, and blue papers in his herbarium as a protest against the restoration of the white flag of the monarchy in France, receives confirmation in the discovery of a portfolio of sheets in the 3 colors, some of them showing the impression of algae, among the remainders of the herbarium of BORNET, who possessed Bory's entire collection of algae; also of blue wrappers containing single red sheets evidently identical with a red mount found with one of Bory's fungi.—*M. F. Warner*.

1166. [BRITTEN, JAMES.] Magnus Spence. *Jour. Botany* 57: 293. 1919.—Spence died at St. Ola, Orkney, Aug. 20, 1919, aged 66. He was a teacher, long headmaster at Deerness, who published the *Flora Orcadensis* (1914), and had special knowledge of the marine algae of the Orkneys.—*Neil E. Stevens*.

1167. [BRITTEN, JAMES.] William Black [i.e., Brack] Boyd. *Jour. Botany* 56: 221-222. 1918.—Boyd died Mar. 6, 1918, in his 88th year. He was one of the best-known Scottish amateur gardeners, greatly interested in alpine, and had one of the finest collections in the United Kingdom. He collected a number of very rare Scottish plants.—*Neil E. Stevens*.

1168. [BRITTEN, JAMES.] William Frederick Miller. *Jour. Botany* 56: 221. 1918.—Miller was born Sept. 18, 1834, the only son of William Miller the well known engraver, and was himself in the business of engraving and color printing. He communicated to the *Journal of Botany* many notes on rare Scottish plants from his vacation rambles, and later, when he retired from business and removed to Somersetshire, notes on plants of that county. He died Apr. 28, 1918.—*Neil E. Stevens*.

1169. CAMUS, FERNAND. Documents pour servir a l'histoire de la botanique dans l'Ouest de la France. I. Une lettre inedite de François Bonamy. [Documents relating to the history of botany in the west of France. I. An unpublished letter of François Bonamy.] Bull. Soc. Sci. Nat. Ouest France III, 5: 31-51. 1915-19 [1920?].—A letter found in the Bornet-Thuret cryptogamic collection at the Paris Natural History Museum, transmitting to A. L. de Jussieu specimens of *Ephedra*, is occasion for notes on Bonamy's *Florae Nannetensis Prodrromus* (1782) and its Addenda (1785), with a few personal data in regard to the author.—*M. F. Warner*.

1170. CHRISTY, MILLER. Wistman's wood on Dartmoor. Country Life [London] 49: 812-813: *illus.* 1921.—This is a unique bit of woodland in the heart of Devon, established in a heap of angular masses of granite, and stretching along the steep side of the valley of the East Dart for perhaps 400 yards, nowhere over 100 yards wide. With the exception of 3 or 4 bushes of mountain ash, it consists of oaks, all apparently *Quercus pedunculata*. Though of great age, they are amazingly dwarfed and stunted, their average height being about 10 feet, the highest not over 15, while in girth the average is 40-60 inches, and 1 tree measured 78. They are in vigorous condition, producing acorns, and a number of young trees are found among them. There is a remarkable epiphytic growth of mosses, lichens, and polypody, possible only on trees of great age and in an exceedingly moist climate, there being an average rainfall possibly exceeding 80 inches. The wood was described by Tristram Risdon 300 years ago exactly as it exists today, and although the tradition that it is entered in the Domesday Book is unsupported, records indicate that some of the trees are well over 500 years old, and the wood itself far older. It has figured in most of the writings on local history and topography, also in the stories of Eden Phillpotts. Its name probably indicates that a "wistman," or "wiseman," an ancient holy man or hermit, once dwelt in it.—*M. F. Warner*.

1171. DOCTERS VAN LEEUWEN, W. M. In memoriam Dr. S. H. Koorders. Bull. Jard. Bot. Buitenzorg III, 2: 237-241. *Portrait.* 1920.—Dr. Koorders died in November 1919, after more than 35 years in the forest service of the Dutch East Indies. The value of his botanical work for the colonies, and especially for the Buitenzorg Garden, which he enriched by the addition of over 40,000 herbarium specimens, is noted; also his more important publications on the forest flora of Java and other works on the colonial flora. A few notes are added from a more extended biography by E. H. B. BRASCAMP, in Tectona 13: 378-504. 1920.—*M. F. Warner*.

1172. DRUCE, G. C. Edward Morgan's Hortus Siccus. Bot. Soc. and Exchange Club British Isles Rept. (1919) 5: 722-724. 1920.—Among the Ashmole MSS. in the Bodleian Library at Oxford are three folio volumes entitled: Hortus Siccus sive Collectio Plantarum ab ipso Eduardo Morgano Facta Ordine Alphabetico, bis Mille Circiter Plantarum Species Exhibens. This collection, which appears to have been begun in 1672, is probably that of the Edward Morgan who lived at Bodesclan, now Bodysgallan, in Wales, who accompanied Thomas Johnson on his expedition into North Wales in 1639.—*G. Claridge Druce*.

1173. [DRUCE, G. C.] Ferdinand Bauer and his landscape drawings. Bot. Soc. and Exchange Club British Isles Rept. (1917) 5: 143-144. 1918.—A collection of water colors by this botanical artist (1760-1829) is noted with brief details of his life.—*G. Claridge Druce*.

1174. [DRUCE, G. C.] John Radcliffe, Bishop of London, as botanist. Bot. Soc. and Exchange Club British Isles Rept. (1917) 5: 142. 1918.—A copy of Sibthorp's Flora Oxoniensis, which was bought by Sir William Osler in 1917, contains numerous MS. notes on plants of Ewelme in Oxfordshire. These have been traced to Bishop Radcliffe (1749-1828), and indicate that he had an excellent knowledge of botany.—*G. Claridge Druce*.

1175. [DRUCE, G. C.] Obituaries. Bot. Soc. and Exchange Club British Isles Rept. (1917) 5: 86-93. 1918.—Obituary notices of the following are included: Sarah M. Baker (died 1917?); Robert Braithwaite (1824-1917); Walter Butt (1850?-1917); Charles Thomas Druery (1843-1917); Edward Evans (1846-1917); William Foggitt (1835-1917); Alan Gordon

Harper (1889-1917); Ruth Holden (1890-1917); Samuel Margerison (1857-1917); George Edward Massee (1850-1917); John Platts (1852-1917); Harry Sanderson (1871-1917); Worthington G. Smith (1835-1917).—*G. Claridge Druce*.

1176. [DRUCE, G. C.] Obituaries. Bot. Soc. and Exchange Club British Isles Rept. (1918) 5: 349-365. 1919.—Brief biographical notices of the following: John Amphlett (died 1918) by CARLETON REA; James E. Bagnall (1830-1918); Clarence Bicknell (1842-1918) by J. W. WHITE; William Brack Boyd (1831-1918); Edward Fry (1827-1918); Joseph John Geake (1890-1918); Charles Baylis Green (died 1918) by I. M. ROPER; Reginald Philip Gregory (1879-1918); Edward Walter Hunnybun (1848-1918); Ernest David Marquand (1848-1918); T. W. Martyn (died 1918); William Frederick Miller (1834-1918); John Mitchinson (1833-1918); Ethel Sargant (1863-1918) by BEATRICE TAYLOR.—*G. Claridge Druce*.

1177. [DRUCE, G. C.] Obituaries. Bot. Soc. and Exchange Club British Isles Rept. (1919) 5: 618-634. 1920.—The following biographical notices are included: Robert Chapman Davie (1887-1919); James M'Andrew (1836-1917); Edward Shearburn Marshall (1858-1919) by F. J. HANBURY; William Osler (1849-1919); Samuel Lister Petty (died 1919); Charles Lan- celot Shadwell (1840-1919); Frederick John Smith (1853-1919); Magnus Spence (1853-1919); James William Helenus Trail (1851-1919); William Tuckwell (1829-1919); Cosslett Herbert Waddell (1858-1919); Anthony Wallis (died 1919); George Stephen West (1876-1919). Brief mention is also made of the following: Casimir de Candolle; Prof. Cogniaux; W. G. Farlow; F. Ducane Godman (died 1919); John Hopkinson (died 1919); A. E. Lechmere; Hector Leveillé; James Sawyer (died 1919); Henri Sudre (1862-1918).—*G. Claridge Druce*.

1178. [DRUCE, G. C.] Robert Dick, of Thurso. Bot. Soc. and Exchange Club British Isles Rept. (1918) 5: 417. 1919.

1179. [DRUCE, G. C.] The dates of publication of Curtis's "Flora Londinensis." Bot. Soc. and Exchange Club British Isles Rept. (1918) 5: 412-414. 1919.—A note supplementing those of W. A. Clark, and Jackson and Pryor in Journal of Botany (1895 and 1881 respectively) by giving dates for the first 10 parts of the 6th fascicle (1791-98), covering 54 species. No. lxi-lxvi were issued before the end of 1791, lxvii-lxx before the end of 1794; lxxi probably appeared in 1795, while lxxii did not come out until about 1798.—*G. Claridge Druce*.

1180. [DRUCE, G. C.] [Rev. of: HARVEY GIBSON, R. J. Outlines of the history of botany. viii + 274 p. A. & C. Black: London, 1919 (see Bot. Absts. 7, Entry 1596).] Bot. Soc. and Exchange Club British Isles Rept. (1919) 5: 594-596. 1920.

1181. GRAVIS, AUGUSTE. La morphologie végétale. [Plant morphology.] Bull. Acad. Roy. Belgique Cl. Sci. 1920: 624-665. 1920 [1921].—There are presented: A history of plant morphology; progress achieved; importance of the problems presented and the efforts to solve them. The author gives a synoptical table of this history.—*Henri Micheels*.

1182. HOFFMAN, G. N. Mt. Lebanon medicine makers—the Shakers. Pharm. Era 53: 197-198, 229-231. 4 fig. 1920.—Their medicinal preparations from native plants, begun as early as 1825, at one time amounted to 75 tons per year. They devised the vacuum process of distillation about 1830, and cultivated drug plants at an early date. The growing and sale of garden seeds was another important industry.—*Neil E. Stevens*.

1183. J[ACKSON], B. D. James William Helenus Trail. Proc. Linn. Soc. London 132: 49-51. 1921.—A sketch of the life and work of Professor Trail (1851-1919), of Aberdeen, is given.—*M. F. Warner*.

1184. J[ACKSON], B. D. John Hopkinson. Proc. Linn. Soc. London 132: 43-45. 1921.—John Hopkinson (1844-1919), actively engaged in business as a piano manufacturer, gave his leisure to scientific pursuits, and for years specially studied graptolites. At the age of 15 he began his herbarium, which in later life he gave to the St. Albans local museum. He was a

member of numerous scientific societies and one of the founders of the Watford, afterwards Hertfordshire, Natural History Society, of which he was an active officer until his death.—*M. F. Warner.*

1185. [JACKSON, B. D.] Methods of botanical illustration during four centuries. *Proc. Linn. Soc. London* 132: 7-9. 1921.—A lecture on illustration, covering: (1) Surface design, including the "block books" and the fine woodcuts of early herbals; (2) copper plate—etching and engraving; (3) reproduction by chemical agency such as photography, lithography, and the like.—*M. F. Warner.*

1186. J[ACKSON], B. D. Prof. George Stephen West. *Proc. Linn. Soc. London* 132: 52-53. 1921.—Prof. West (1876-1918) of Birmingham, the leading authority upon freshwater algae of the United Kingdom, was the son of the prominent algologist William West, with whom he jointly published many works, also writing independently many papers and 2 books in his special subject: *British Freshwater Algae* (1904), and *Algae* (1916).—*M. F. Warner.*

1187. J[ACKSON], B. D. Rev. Edward Shearburn Marshall. *Proc. Linn. Soc. London* 132: 45-46. 1921.—A brief sketch is given of the life and botanical work of E. S. Marshall (1858-1918).—*M. F. Warner.*

1188. J[ACKSON], B. D. William James Tutchter. *Proc. Linn. Soc. London* 132: 51-52. 1921.—Tutchter was born 1867 and died in March, 1920. He was Superintendent of the Botanical and Forestry Department of Hongkong, where he had spent nearly 30 years, giving much time to botanical exploration. In 1912 he collaborated with S. T. Dunn in the publication of the *Flora of Kwantung and Hongkong*.—*M. F. Warner.*

1189. KRONFELD, E. M. *Sagenpflanzen und Pflanzensagen*. [Legendary plants and plant lore.] 96 p., 23 fig. Theod. Thomas: Leipzig, [1919].—The book includes popular legends and literary associations of plants in connection with wars and deeds of heroism.—*Neil E. Stevens.*

1190. MALTE, M. O. James Melville Macoun, C. M. G. *Canadian Field Nat.* 34: 38-40. *Portrait*. 1920.—Macoun was born in Belleville, Ontario, in 1862, the son of Professor John Macoun; he died January 8, 1920. The present article brings out especially Macoun's work as a field naturalist and explorer.—*M. F. Warner.*

1191. MARIBOE, CARL. Leopold Helweg. *Tidsskr. Landøkonomi* 1920: 388-393. *Portrait*. 1920.—Leopold Hans Andreas Helweg was born in Copenhagen March 2, 1851, and died August 6, 1920. In 1886 he became director of the investigations on root crops of the Danish society for the improvement of cultivated plants; when the experimental work was taken over by the government in 1893, Helweg continued as director until his death. He wrote many articles for agricultural papers, and a monograph of the varieties of carrot. From 1886 to 1901 he was editor of *Gartner-Tidende*; he edited the *Nordisk Illustreret Havebrugsleksikon* (Scandinavian illustrated gardeners' dictionary), and in 1895 published a work on plant forcing.—*M. F. Warner.*

1192. R[ENDLE], A. B. William Robert Carver. *Jour. Botany* 56: 334-335. 1918.—Carver (1860-1918) was for many years departmental clerk in the cryptogamic section of the Department of Botany of the British Museum (Nat. Hist.), and had an extensive knowledge of seaweeds.—*Neil E. Stevens.*

1193. RICALTON, JAMES. Famous and interesting trees. *Amer. Forestry* 27: 216-224. 10 fig. 1920.—Banyan trees (*Ficus religiosa* or *Ficus indica*), the olive, rubber trees, and others are described.—*Chas. H. Otis.*

1194. SALMON, C. E. Anthony Wallis. *Jour. Botany* 57: 347-348. 1919.—Wallis (1879-1919) was inspector in the Education Department. While at Cambridge he compiled *The*

Flora of the Cambridge District for Marr's Natural History of Cambridgeshire, and later communicated new localities and rare plants to Druce's Flora of Cambridgeshire.—*Neil E. Stevens.*

1195. SMITH, A. L. William Gilson Farlow. *Proc. Linn. Soc. London* 132: 33-39. 1921.—A brief sketch of Prof. Farlow (1844-1919), commenting on his cordial relations with British botanists, is presented.—*M. F. Warner.*

1196. STEELE, J. G. History of the California College of Pharmacy. *Pacific Pharm.* 12: 78-79, 100-104, 129-131, 151-157, 179-182. 1918.

1197. STURMER, J. W. 1820—A bit of history. *Western Druggist* 42: 110-112. 1920.—A comparison of apothecaries of today with those of one hundred years ago is made.—*C. M. Sterling.*

1198. VELU, H. Les fleurs—leur rôle social. [The function of flowers in society.] *Bull. Soc. Hort. Maroc* 8: 50-59. 1920.—The significance of exhibitions and floral feasts and the possibilities of Morocco as a source of medicinal and perfume plants are discussed, with extracts from the legendary and literary lore of flowers.—*M. F. Warner.*

1199. VINES, S. H. Simon Schwendener. *Proc. Linn. Soc. London* 132: 47-49. 1921.—Schwendener was born February 10, 1829, and died May 10, 1919. He began his university course at Geneva under Alphonse de Candolle, and graduated at Zurich under Oswald Heer in 1856. Coming into relations with Naegeli, Schwendener turned his attention to the microscopical anatomy of plants. His "contribution to the right understanding of Lichens is his first claim to remembrance as a botanist. His second claim is that he founded and prosecuted to some extent, the study of physiological anatomy." In 1879 he became professor of botany at Berlin, where he remained to the end of his life, and inspired a number of his students to research in physiological anatomy.—*M. F. Warner.*

1200. YURIN VASSIL, P. K sud'be Tingutinskogo s.-kh. uchastka v sviazi s vozrozhdeniem sel'skogo khoziaistva na iugo-vostoke Rossii. [The fate of the Tingutinski experimental grounds.] *Narodnoe Khoziaistvo* [Moscow] 1920: 69-70. 1920.—Some very important work, particularly on irrigation, was carried on in the pre-war period on the Tingutinski agricultural grounds, in the former province of Saratov, comprising some 5416 acres. These are now in a lamentable condition due to the circumstances of the civil war. However, measures already have been taken for their reconstruction, and great developments in the future are expected.—*M. Shapovalov.*

BOTANICAL EDUCATION

C. STUART GAGER, *Editor*

ALFRED GUNDERSEN, *Assistant Editor*

(See also in this issue Entries 1244, 1393, 1395 1607)

1201. ALBURTIS, S. S. How school children study trees. *Amer. Forestry* 27: 291-298. 14 fig. 1921.

1202. BEARD, J. G. The business of teaching. *Druggists Circ.* 65: 123-126. 1921.—The author discusses the importance of more and better educational training, and continued scientific research in pharmacy.—*C. M. Sterling.*

1203. BÖHMER, J. G. Landbrukshöiskolens skogbruksavdeling. [Forestry division of the agricultural high school, Norway.] *Tidsskr. Skogbruk* 29: 73-78. 1921.—Revised curriculum, in forestry, according to the law of July 23, 1919, is presented for the 3-year course at the Norwegian School of Agriculture.—*J. A. Larsen.*

1204. BORGMANN, W. Ausbau des forstlichen Hochschulunterrichts an der Hessischen Landesuniversität Giessen. [Expansion of academic forestry course at the University of Giessen.] *Forstwiss. Centralbl.* 43: 62-69. 1921.—Even before the war the movement was inaugurated to combine the forest schools of Tübingen, Giessen, and Karlsruhe in 1 school at Heidelberg. Since the war, this plan has been abandoned, but Württemberg and Baden have combined their courses, given at Freiburg. This location is not convenient for Hesse, and it has been decided to maintain and enlarge the course at Giessen. The article appeals for oral and material support from all interested persons and organizations.—W. N. Sparhawk.

1205. COOPER, ZADA M. Report of the committee to investigate "short term," correspondence, summer, and other similar courses. *Pacific Pharm.* 12: 267-272. 1919.

1206. FABRICIUS. [Rev. of: LINSBAUER, KARL. WIESNER, JULIUS. *Elemente der wissenschaftlichen Botanik*. I Band. *Anatomie und Physiologie der Pflanzen*. 6th ed., 412 p., 303 fig. Alfred Hölder: Berlin and Leipzig, 1920.] *Forstwiss. Centralbl.* 43: 75-77. 1921.—The present is an entirely revised edition. Fabricius expresses the wish that botanists pay a little more attention to trees instead of confining their discussions and illustrations almost entirely to crop or weed plants. For instance, the discussion of the influence of light upon seed germination in *Ranunculus*, *Allium*, or *Pinguicula*, could have been illustrated just as well with results of research on forest-tree seeds.—W. N. Sparhawk.

1207. GATHERCOAL, E. N. Bacteriology in pharmacy colleges. *Druggists Circ.* 64: 171-172. 1920.

1208. GRAVIS, A. *Éléments de morphologie végétale*. [Elements of vegetable morphology.] 16 X 26 cm., 204 p., 32 pl. H. Vaillant-Carmanne: Liège, 1920.—This text book is intended for use in a course in plant morphology based on the study of representative types. It comprises 3 main parts. The 1st, "Notions of Cytology," deals with cells—their structure, physiological responses, and origin by division. In the 2nd part, "Principal Types of Vegetable Organization," representative types of the great plant groups are taken up with reference to their organs of vegetation, asexual propagation, sexual reproduction, and spore production. This part includes also a synthetic survey of the evolution of the plant kingdom. In the 3rd part, "Study of Angiospermous Plants," the organography, anatomy, and classification of flowering plants are considered in somewhat greater detail. The book is illustrated with 32 plates of diagrammatic figures. An unusual feature is a collection of quotations from the writings of eminent men on the subjects of science, scientific method, study, etc.—L. W. Sharp.

1209. HEPLER, J. R. Teaching systematic olericulture. *Proc. Amer. Soc. Hort. Sci.* 17: 169-172. 1920 [1921].—The method of study and presentation of a college course in systematic vegetable gardening is discussed.—H. A. Jones.

1210. RUDD, WORTLEY F. Bacteriology in the two year course. *Druggists Circ.* 65: 127-128. 1921.—Arguments are presented in favor of a short course in bacteriology intended to enable pharmacists to take a more active part in various public health activities.—C. M. Sterling.

1211. SCHNEIDER, ALBERT. A full-time four-year college of pharmacy course. *Pacific Pharm.* 12: 185-188. 1918.—An outline of studies is presented for a full 4-year course in pharmacy and suggestions on teaching methods and equipment of teachers.—C. M. Sterling.

1212. SCHÜPFER. [Rev. of: KÖLLNER, F. *Forstwirtschaft*. 84 p., 26 fig. Paul Parey: Berlin, 1921.] *Forstwiss. Centralbl.* 43: 189-190. 1921.—This is a brief elementary forestry textbook for the use of agricultural schools. Schüpfer points out several misstatements.—W. N. Sparhawk.

1213. SVESSENGUTH, KARL. [Rev. of: KRAEPELIN, KARL. *Einführung in die Biologie. (Introduction to biology.) 4th ed.* B. G. Teubner: Leipzig and Berlin, 1919.] *Forstwiss. Centralbl.* 43: 73-74. 1921.—A most excellent and well illustrated textbook for the higher schools, as well as for self-instruction. The physiological side has been emphasized more than in previous editions, and chapters on heredity, genetics, and other subjects have been added.—*W. N. Sparhawk.*

1214. SVESSENGUTH, KARL. [Rev. of: MIEHE, H. *Allgemeine Biologie. (General biology.)* Vol. 130 of the series, "Aus Natur und Geisteswelt."] *Forstwiss. Centralbl.* 43: 74-75. 1921.

1215. WELLS, B. W. A method of teaching the evolution of the land plants. *Torreyia* 21: 45-47. 1 pl. 1921.—The comparative method constitutes the only vital approach to the story of plant evolution. The types must be brought together so that they can be automatically compared. The plate, which is the work of a freshman student, illustrates how this may be done graphically. The life cycles are drawn concentrically, the lowest in the center. The significant stages are marked out by radii. Each circle is filled in by the student as he finishes his study of the type. All the evolutionary changes in a given structure are seen by following its radius outward.—*J. C. Nelson.*

CYTOLOGY

GILBERT M. SMITH, *Editor*

GEORGE S. BRYAN, *Assistant Editor*

(See in this issue Entries 1296, 1297 1298, 1300, 1370, 1515)

FOREST BOTANY AND FORESTRY

RAPHAEL ZON, *Editor*

J. H. HOFMANN, *Assistant Editor*

(See also in this issue Entries 1193, 1203, 1204, 1212, 1547, 1559, 1561, 1565, 1601, 1602, 1677, 1682)

1216. ANONYMOUS. *Das Reichsforstgesetz.* [The forest law for the German Empire.] *Forstwiss. Centralbl.* 43: 37-39. 1921.—This is the text of the proposed Imperial forest law formulated by the Imperial Forestry Council (*Reichsforstwirtschaftsrat*) in September, 1920. It is designed to make the practice of forestry compulsory on all forest lands in the empire, regardless of ownership. Administration of the laws, as well as the details of the laws themselves, are left for the most part to the individual states.—*W. N. Sparhawk.*

1217. ANONYMOUS. Forestry in relation to agriculture. *Agric. News* [Barbados] 20: 34. 1921.—The author discusses the differences between forestry and agriculture, pointing out where the two overlap. Forestry in tropical America, now and for some time to come, should proceed only on lines of organization, survey, and judicious cutting, and to a lesser degree along those of reafforestation, mensuration, high finance, and working plans.—*J. S. Dash.*

1218. ANONYMOUS. *Indberetning om det Norske skogvesen.* [Report of the Norwegian Forest Service.] *Indeberet. Norske Skogv.* 1919: 1-130. 1921.—A very complete and comprehensive report of the Director for the calendar year 1919 is presented, setting forth all forest activities in the different districts. The net receipt was 4,624,685 kroner; the total cut 378,918,325 cubic meters; there were 108 forest fires which covered about 200 hectares and caused a damage of 21,446 kroner. The personnel consists of 3 inspectors, 2 assessors, 24 assistants and 504 rangers or "Vogtere." The service planted 552,977 trees.—*J. A. Larsen.*

1219. ANONYMOUS. *Lieferung von Waldsamen an die Entente.* [Delivery of forest seeds to the Entente.] *Deutsch. Forstzeitg.* 36: 220. 1921.—Germany is required to deliver to the Entente countries stocks of forest-tree seeds and plants over a period of some 10 years. In the spring of 1921 the deliveries to France, Belgium, and Italy aggregate 6700 kgr. of pine seed and 2100 kgr. of spruce seed, besides considerable quantities of ash seed.—*W. N. Sparhawk.*

1220. ANONYMOUS. *Lumber used in the motor vehicle industry.* *Sci. Amer. Monthly* 3: 274-275. 1921.

1221. ANONYMOUS. *Satzung des Verbandes "Bayerische Waldversicherung."* [Constitution of the association "Bavarian Forest Insurance."] *Forstwiss. Centralbl.* 43: 31-37. 1921.—The text of the constitution is given.—*W. N. Sparhawk.*

1222. ANONYMOUS. *Steigerung des Ertrages der deutschen Waldungen.* [Increasing the yield of German forests.] *Deutsch. Forstzeitg.* 36: 125-126. 1921.—The suggestion, made at the Brussels financial conference, that the production of German forests could be increased, is impossible of fulfillment, because Germany lost 1.5 million hectares of forest by the peace treaty and is already cutting as much as the annual growth, or more. In 1912, 47.8 million cubic meters of timber were cut, $\frac{2}{3}$ of which was construction material (*Nutzholz*); the remaining forests cannot yield more than 40 million cubic meters without diminishing the forest capital.—*W. N. Sparhawk.*

1223. ANONYMOUS. *The forest reserves of Trinidad and Tobago.* *Agric. News [Barbados]* 19: 374. 1920.—A report by C. S. ROGERS, Conservator of Forests, is discussed. The policy of the Government is to reserve certain areas for (a) the protection of the water supply, the preservation of favorable climatic influences, and the maintenance of suitable breeding places for the bird and insect friends of agriculture; and (b) the production of timber and other forest products necessary for the welfare of the community.—*J. S. Dash.*

1224. ANONYMOUS. [Rev. of: COPPET, M. DE, UND A. HENNE. *Allgemeine Orientierung über Kriegswirtschaftliche Massnahmen betreffend Waldwirtschaft, Nutzungen, und Holzverkehr 1914-1919.* (Wartime measures dealing with forest management, utilization, and timber trade.) Bern, 1920.] *Forstwiss. Centralbl.* 43: 78-79. 1921.—The book recounts wartime regulations in Switzerland and their effect on Swiss forests and economic life. The war changed Switzerland from a wood-importing country to a wood-exporter, but in 1920 she again became an importer. In 1914 imports of wood exceeded exports by 20,230,000 francs, while in 1918 exports led by 117,970,000 francs. In 1913 the net import, in volume, of timber, lumber, and firewood amounted to 557,513 cubic meters, while in 1916, the year of greatest export (by volume), the net export was 883,689 cubic meters.—*W. N. Sparhawk.*

1225. BILLWILLER, R. *Über die Föhnsturmkatastrophe vom 4/5 Januar 1919 im Berner Oberland.* [The catastrophe caused by the southerly winds of January 4 and 5, 1919, in the higher altitudes of the Bern region.] *Schweiz. Zeitschr. Forstw.* 72: 2-11. 1 map. 1921.—A contribution by Billwiller and observations by VON GREYERZ are presented. The damage done by this storm was greater than any recorded for more than a decade. The damaged timber was about 90 per cent uprooted and 10 per cent broken, and was thrown in all directions in some localities and in a northeasterly direction in others. A total of 807,550 cubic meters was windthrown, and about 200 hectares were reduced to the non-productive state.—*J. V. Hofmann.*

1226. CIESLAR, A. *Über die Erntezeit der Früchte der gemeinen Esche (Fraxinus excelsior L.).* [Concerning the time for collecting seed of the common ash (*Fraxinus excelsior*).] *Centralbl. Gesam. Forstw.* 46: 90-100. 1920.—Despite many years of silvicultural experience with ash, there is still comparatively little known regarding the best time and methods of collecting, storing, and planting the seed. In nature, ash seed does not generally germinate until the 2nd year. The author experimented to ascertain chiefly whether it could not be germinated the 1st year after ripening. Seed was collected Sept. 17, Nov. 17, Jan. 8, and Feb. 28.

That gathered on the first 2 dates was handled by 3 methods: (1) Sowing immediately in seed beds; (2) storing in moist sand until sowed in the spring; (3) hanging up in bags in the storehouse until sowed in the spring. The seed gathered in January was handled by the 2 last-mentioned methods and that gathered in February only by the last method. In the 1st spring (1918) germination took place and plants developed only from the September seed that had been either sowed directly or stored in sand. In all other cases germination did not take place until the 2nd spring (1919), when all the remaining classes of seed germinated, the percentage of germination increasing the later the date of collecting the seed.—R. H. Weidman.

1227. DAHL, A. L. Some special uses of redwood. *Sci. Amer.* 124:286, 297. 4 fig. 1921.

1228. DOCK, H. Die Stereophotogrammetrie und ihre Bedeutung für die Forstwirtschaft. [Stereophotogrammetry and its application in forest management.] *Centralbl. Gesam. Forstw.* 46: 65-90. 1920.—The author discusses in detail the phototopographic method of surveying, including a discussion of the theory of the method, description of the instruments, and an illustration of the use of the method on an actual area. The essential field instrument is the phototheodolite and the office instruments are the stereokomparator and the stereoautograph. The last is a drafting instrument of complicated mechanism and is evidently a more recent development and refinement in the office work of the camera surveying method. The author is an engineer and the article is purely in the domain of engineering.—R. H. Weidman.

1229. ECKSTEIN, FRITZ. Ueber die Lebensweise von *Thanasimus (Clerus) formicarius* Latr. [Notes on the life history of *Thanasimus (Clerus) formicarius* Latr.] *Forstwiss. Centralbl.* 43: 57-62. 1921.—But little has been written concerning the life history of this insect, which is generally considered to be of great importance as an enemy of the bark beetles, especially *Myelophilus piniperda*. This paper outlines the life cycle of the beetle (approximately 1 year), and compares it with that of *Myelophilus*. The increase is not very rapid, since the female lays only 20 or 30 eggs, and the larvae develop more slowly than those of *Myelophilus* or the other bark beetles (*M. minor*, *Hylastes ater*, *Tomicus typographus*, and others). The latter reproduce much more rapidly. It is concluded that *Clerus* is of comparatively little importance in combating the bark beetles, although it helps to keep their numbers in check.—W. N. Sparhawk.

1230. EHRHORN, E. M. Report of the Chief Plant Inspector. Rept. Bd. Commissioners Agric. and Forest. Hawaii 1919-1920: 75-85. Pl. 16-22. 1921.—Packages containing plants and plant products to the number of 579,207 were inspected for insect and fungous diseases. Presence of citrus canker (*Pseudomonas citri*) in Honolulu is reported.—J. M. Westgate.

1231. ENDRES. Die Bayerische Waldversicherung. [Bavarian forest insurance.] *Forstwiss. Centralbl.* 43: 1-6. 1921.—The new forest insurance association, formed in Bavaria in 1920, embodies some new principles which it is hoped will make insurance of forests more practicable. Private individuals, as such, cannot insure their forests; they must do so through the medium of their communes or through associations. The business is limited to fire insurance at first, but it is planned later to cover losses by insects, diseases, wind, etc. Insurance applies to the entire forest property in Bavaria of each owner who takes out a policy, and premiums are determined on a flat area basis, regardless of species or age of stand. Indemnities are limited to a value of not to exceed 1000 marks per hectare, unless the owner has paid extra premium for a higher insurance. The insurance association has adopted another feature to encourage forest loans. It contracts with the lender to protect him against losses due either to fire or to felling of timber contrary to agreement by the owner, and thereby makes his loan much more secure.—W. N. Sparhawk.

1232. ENDRES. [Rev. of: ENGLER, ARNOLD. Untersuchungen über den Einfluss des Waldes auf den Stand der Gewässer. (Influence of forest cover on water supplies.) *Mittel. Schweiz. Zentralanst. Forst. Versuchsw.* 12: 1-626. 58 fig. 1919 (see Bot. Absts. 9, Entry 710).] *Forstwiss. Centralbl.* 43: 114-119. 1921.—Endres outlines Engler's results on the 2 areas

(Sperbelgraben and Rappengraben), and points out several weak points in the way the project was carried out; for instance, (1) the 2 areas were in several respects not entirely comparable, and (2) the lack of satisfactory records of the actual amount of precipitation on the experimental areas. He does not feel entirely convinced by Engler's figures, but believes that no amount of exact measurement can absolutely solve the question of the relation between forests and water.—*W. N. Sparhawk.*

1233. FABRICIUS. [Rev. of: BERTO, HERMANN. *Die Beschaffung des Kiefernnsamens insbesondere seine Selbstgewinnung.* [The gathering of pine seed.] 124 p., 8 fig. J. Neumann: Neudamm, 1920.] *Forstwiss. Centralbl.* 43: 71-72. 1921.—This book, based on the results of research by CIESLAR, SCHOTT, ENGLER, KIENITZ, HAACK, and DENGLE, is written especially for private foresters and forest owners. It brings out very clearly the desirability of collecting one's own seed, instead of relying on seedsmen, both because of the uncertainty as to origin of commercial seed, and because such seed may have been handled in such a way as to seriously affect its quality. Figures are given to show that self-collected seed costs much less than that obtained from dealers.—*W. N. Sparhawk.*

1234. FABRICIUS. [Rev. of: BORGMANN, WILHELM. *Die Begründung und Erziehung von Holzbeständen.* [Formation and tending of timber stands.] 215 p., 35 fig. Paul Parey: Berlin, 1920.] *Forstwiss. Centralbl.* 43: 27-29. 1921.—The book is not a text book on silviculture, but is an excellent popular treatise for the use of forest owners who are not technically trained in forestry.—*W. N. Sparhawk.*

1235. FABRICIUS. [Rev. of: SOLLA, R. E. *Holzgewächse zur Winterszeit. Anleitung zum Bestimmen entlaubter Holzgewächse.* [Woody plants in winter. Guide for the identification of woody plants in the absence of their leaves.] 42 p., 50 fig. Theodor Fischer: Freiburg i. Br., 1920.] *Forstwiss. Centralbl.* 43: 79. 1921.—The book is simple and usable, and contains keys for the identification of 56 species of deciduous trees and 80 species of shrubs of central and southern Europe.—*W. N. Sparhawk.*

1236. FABRICIUS. [Rev. of: WIEBECKE, VON. *Der Dauerwald in 16 Fragen und Antworten für den Gebrauch im Walde.* (The "continuous forest.") Stettin.] *Forstwiss. Centralbl.* 43: 195-198. 1921.—Von Wiebecke's "Dauerwald" is the same silvicultural system as that used by von Kalitsch in Bärenthorn. In spite of all the claims made for it, Fabricius points out that it has certain disadvantages as compared with the clear cutting systems, and that it is essentially only a selection system under a new name.—*W. N. Sparhawk.*

1237. FABRICIUS. [Rev. of: WILDA, HERMANN. *Das Holz, Aufbau, Eigenschaften und Verwendung.* (Wood, its structure, properties, and use.) 154 p., 109 fig. Walter de Gruyter & Co.: Berlin and Leipzig, 1920.] *Forstwiss. Centralbl.* 43: 190-191. 1921.—This book attempts to give in a form adapted for popular use all the essential facts about wood and its uses. In attempting to condense the material, the author has sacrificed much in the way of completeness and accuracy, especially on the scientific side.—*W. N. Sparhawk.*

1238. FRIES, THORE C. E. *Björkskogsgränsens höjdläge inom Tromsø Amt.* [Upper limit of birch in Tromsø district, Norway.] *Tidsskr. Skogbr.* 29: 48-72. 1921.—An examination of the causes in the variation of the upper limit of birch, *Betula odorata*, at the northern limit of its distribution.—*J. A. Larsen.*

1239. FROST, S. *Forestry from the air.* *Amer. Forestry* 27: 278-280. 2 fig. 1921.—The author concerns himself with the use of airplanes in forest mapping, reconnaissance, and other operations in a Canadian forest.—*Chas. H. Otis.*

1240. GOOSSENS, M. *Notes sur un peuplement de parasoliers aux environs de Ganda-Sundi.* [Note on a parasol tree association in the neighborhood of Ganda-Sundi.] *Bull. Agric. Congo Belge* 11: 74-79. Fig. 17-18. 1920.—The parasol tree (*Musanga Smithii*) grows very

readily in forest clearings and abandoned plantations. It has been recommended as a shade tree for cacao plantations but has not proved suitable. Several other uses are suggested; it is particularly suitable as raw material for the manufacture of paper, and would probably prove remunerative if cultivated for this purpose.—*E. M. Doidge*.

1241. HARRER, FR. *Harzgewinnung in Amerika*. [Resin production in America.] *Forstwiss. Centralbl.* 43: 130-137. 1921.—The methods of harvesting and distilling resin in Florida are briefly described, with old statistics of production and exports of turpentine and rosin. It is concluded that the U. S. A. will in a short time be unable to more than supply its own requirements. Germany could theoretically supply her own needs for turpentine and pine oil, but not for rosin, if the question of cost were left out of consideration. Unless substitutes can be derived from coal tar distillation, rosin supplies must be sought in other countries, especially the tropics.—*W. N. Sparhawk*.

1242. HEES. *Klasseneinteilung des Nadel-Stammholzes*. [Classification of conifer logs.] *Deutsch. Forstzeitg.* 36: 199. 1921.—Softwoods, like hardwoods, should be classified according to diameters instead of by the total cubic volume of the piece, regardless of size. With the present system, short thick sticks suitable for lumber are often classed with long slender ones suitable only for mine props.—*W. N. Sparhawk*.

1243. HEIBERG, Axel. *Det Norske Skogselskap*. [The Norwegian forestry association.] *Tidsskr. Skogbr.* 28: 187-200. *Pl. 10*. 1920.—The author sums up the results of an inspection trip of the forest plantations on the west coast of Norway near Stavanger and Bergen. These plantations are up to 50 years old and consist of Norway spruce, Scotch pine, Douglas fir, noble fir, oak, and birch. The soil is generally excellent for reforestation and the local sentiment in favor of this work very good, thanks to the energetic leadership of a few men. Private owners are required by law to cut according to the State's dictum and to replant denuded tracts.—*J. A. Larsen*.

1244. HOHENADL, W. *Das Versuchswesen und das wirtschaftliche Prinzip in der Forstwirtschaft*. [Research and the economic principle in forest practice.] *Forstwiss. Centralbl.* 43: 50-57, 84-100, 137-151. 1921.—In view of the recent suggestion that forest research in Bavaria be divorced from the forest schools and provided for in a separate state research institute, the author reviews briefly the development of forest research in Bavaria. When first organized under the leadership of GANGHOFER in 1875, it was independent of the schools, and the economic purpose was emphasized, namely, to determine scientific principles and to devise ways for applying them in forest practice, with the object of insuring a continuous production of maximum values with a minimum of outlay. The reorganization in 1882 transferred research to the forest department of the University of Munich, where it has since remained, and provided for a combination of the purely research objective with training in scientific forestry. To again set research apart by itself would surely not help to secure the application of its findings in actual forest practice, for even now many of the principles evolved by research are far from being assimilated by the practitioners. Forestry has not kept pace with other industries in improving its technique and organization of work to meet changing conditions, but has practically stood still. The author reviews the development of industry from the phase of the individual handworker to the present-day phase of large factory units with division of labor and dependence on the engineer or technician, not only for developing mechanical methods and processes but also for scientifically organizing the work and personnel. All such engineering work is based very largely on mathematical research,—cost accounting, time studies, measurements of various sorts. Forestry has lagged behind because of the forms of ownership of forests: small peasant owners; state and communes not interested solely in the most profitable management; and large private owners whose management is guided by tradition or by a desire to maintain game preserves. Foresters themselves have been very conservative and slow to adopt new ideas.—The chief problems for forestry research are problems of measurement (of trees, stands, forest sites and site factors), and of the correlation of these measurements with different conditions of growth or different methods of management.

These studies are necessary in addition to fundamental research, because the long period required to grow timber and the great diversity of conditions require the gradual accumulation of the results of actual experience by many investigators, and their results must be expressed in the same terms and must be comparable. The investigator must work in the forest and in closest touch with practitioners, because it is as important that the scientific principles be applied in actual practice as it is to discover the principles. It is desirable that the research institution be responsible for the economic management of a demonstration forest, since this will help to keep science and practice closely tied together.—*W. N. Sparhawk.*

1245. HOLM, C. J. Et Forsøg med fremmede Løvtraer. [Experiments with exotic deciduous trees.] Forst. Forsøgsv. Danmark 5: 293-300. 1920.—Experimental plantations were begun on Seeland, Denmark, in 1912. The species most extensively tried were *Quercus rubra*, *Q. palustris*, and *Betula odorata*. Tests were also made of *Quercus coccinea*, *Betula lutea*, *B. Maximowiczii*, *Acer Negundo*, *Fraxinus americana*, *Ceridiphyllum japonicum*, *Acanthopanax ricinifolium*, and *Albizia Julibrissin*. The precipitation approaches 2 inches per month in June, July, and August; April has 8 and May 1 days of frost. The results are discouraging. The oaks suffered heavily from spring frost and are practically all dead; *Betula lutea*, *Acer Negundo*, and *Fraxinus americana* are failures, but *Betula odorata* and *B. Maximowiczii* are very promising.—*J. A. Larsen.*

1246. HÖNLINGER, H. Zum Methodenstreit in der forstlichen Statistik. [On the controversy over methods of forest statistics.] Centralbl. Gesam. Forstw. 46: 100-111, 144-151. 1920.—The author concerns himself chiefly with a refutation of Dr. NEUBAUER's conception of the theory of highest interest on capital value of the forest (Reinertragslehre), which appeared in the above journal for 1918. The forest finance and mathematics of valuation formulae are analyzed in detail to prove the author's position.—*R. H. Weidman.*

1247. HUTTANUS. Waldverwüstung. [Forest destruction.] Deutsch. Forstzeitg. 36: 157, 159. 1921.—Most of the forests near Cologne are in private hands, and practically all are being laid waste, with no provision for a future stand. Only strict state control of cuttings can save what remains.—*W. N. Sparhawk.*

1248. JOLYET, A. Repeuplement artificiel dans une station de friche après exploitation à blanc étoc d'un peuplement de pin noir. [Artificial reforestation after clear cutting of black pine.] Bull. Trimest. Soc. Forest. Franche-Comté et Belfort 13: 273-277. 1920.—Black pine is better adapted than any other species to thin-soiled, calcareous wastes at low altitudes in eastern and northeastern France. Natural regeneration is, however, very difficult, and artificial regeneration after each rotation very expensive. It is therefore suggested that clear cuttings, which are usually resorted to, be followed by the planting of Douglas fir (green variety), hornbeam, and black locust, with an occasional sycamore maple. Planting holes should be made in rows 1.5 m. apart each way. A Douglas fir should be planted in every 6th hole in every 6th row,—about 120 per hectare. In each of the other holes should be planted a tuft of 4 trees composed of 2 hornbeams and 2 locusts. A stand of this sort is well adapted to the site and will perpetuate itself indefinitely by a combination of sprouts and seedlings.—*S. T. Dana.*

1249. JUDD, C. S. Report of the Superintendent of Forestry. Rept. Bd. Commissioners Agric. and Forest. Hawaii 1919-1920: 19-45. Pl. 1-12. 1921.—Emphasis is laid on the necessity of forest protection and forest extension (total of 71,641 trees of 37 species transplanted to 11 forest reserves throughout the Islands); methods of reducing fire menace; and Arbor Day activities.—*J. M. Westgate.*

1250. KIERULF, T. Fra en skogtur i Normandie og litt om de Franske bøgeskoge. [A trip to Normandy and a little about the French beech forests.] Tidsskr. Skogbr. 29: 10-22. Pl. 1-7., fig. 1. 1921.—The author presents a description of a 10,607 hectare beech and oak forest at Lyons, near Rouen, France, including silviculture and management.—*J. A. Larsen.*

1251. KOBAYASHI, J. Paper making in Japan. *Amer. Forestry* 27: 320-321. 2 fig. 1921.
1252. KÜNKELE. Hilfstafel zur Zuwachserhebung. [Graphic chart for determining increment.] *Forstwiss. Centralbl.* 43: 81-83. *Chart 1*. 1921.—A chart giving the per cent of increment of basal area, height, volume, and value of individual trees, is illustrated and discussed briefly. The determination of growth per cent of individual trees is particularly important now that silviculture is turning strongly toward the selection system.—W. N. Sparhawk.
1253. KURTH. Fichtensaat oder -pflanzung? [Spruce seeding or planting?] *Deutsch. Forstzeitg.* 36: 147. 1921.—Spruce stands grown from plantations do not, because of comparatively wide spacing, produce long slender poles, especially bean poles, which are in great demand. Therefore about 10 per cent of the area restocked with spruce each year should be seeded instead of planted.—W. N. Sparhawk.
1254. L. [Rev. of: ACHTERRATH, HELMUT. *Deutsche Rohholzwirtschaft während des Krieges und in der Übergangszeit.* (German timber supply during the war and in the transition period.) Frankfurt.] *Forstwiss. Centralbl.* 43: 29-30. 1921.—Achterrath discusses the timber situation before the war, measures adopted to insure supplies for the army and civil use during the war, and the outlook for the future, with especial reference to future sources of imports.—W. N. Sparhawk.
1255. LONGVILLE, A. Logging by electricity. *Sci. Amer.* 124: 285. 2 fig. 1921.
1256. MAHOOD, S. A., AND ELOISE GERRY. The production of American storax. *Druggists Circ.* 65: 3-5. *Fig. 1-7*. 1921.—Experiments were carried on to find a supply of storax to take the place of Asiatic storax which was shut off by the World War. Collections of material for investigation were made from *Liquidambar styraciflua* growing near Elliott City, Louisiana, from June 10 to Nov. 14. Methods of tapping the trees and collecting the gum are described. Chemical analyses show that American storax compares very favorably with that of Asiatic origin. A microscopic examination of the wood shows that the storax is produced in the wood formed after the tree has been wounded. The yield of storax is in proportion to the number and size of the ducts thus developed.—C. M. Sterling.
1257. MILLER, E. E. Black locust reclaims washed lands. *Amer. Forestry* 27: 252-253, 264. 4 fig. 1921.
1258. MÜNCH, ERNST. *Naturwissenschaftliche Grundlagen der Kiefernharznutzung.* [Scientific bases of production of pine resin.] *Arbeit. Biol. Reichsanstalt Land- u. Forstw.* 10: 1-140. 20 fig. 1919.—The scarcity of naval stores in Germany during the war led to the utilization of the resin of *Pinus sylvestris* as a new industry. Münch attempts to place the technique of tapping on a scientific basis. The careful study comprises the following points: Microscopic structure of the resin duct; distribution and number of ducts with relation to width of annual ring; structure of the system of ducts throughout the bole; physiology and mechanics of the formation and flow of resin upon tapping; formation and rôle of pathological ducts; influence of climate, site, age, crown development of tree, method of tapping, and intervals between tapping on yield. The yield may vary up to 400 per cent. The possible yield per hectare per year is 1000-1250 kgr.—E. P. Meinecke.
1259. NEUMANN. *Die Kiefer-Dauerwaldwirtschaft.* [The continuous management system with pine.] *Deutsch. Forstzeitg.* 36: 189-193. 1921.—The author has visited the Barenthorn forest in Anhalt, where VON KALITSCH has developed an original and highly successful method of silviculture. Stands are thinned every year, sometimes twice a year, beginning at 25 or 30 years of age, until about 10 seed trees per hectare are left. Logs are dragged out by horses, so as to loosen the soil and favor reproduction; because of the density of the latter, it does not matter that some seedlings are destroyed in removing the seed trees. All leaf litter and twigs are left on the ground to protect and enrich the soil. This method has resulted in most

excellent and thrifty reproduction of pine, has favored the increase in proportion of desirable hardwoods, such as beech, and has also resulted in a much more rapid height-growth of the pine than that in the neighboring forests managed by the old clear-cutting system. The method requires much more intensive work and can only be applied by technically trained foresters. By the use of this method von Kalitsch has increased the annual yield of his forest from 2.2 to 6.3 cubic meters per hectare.—*W. N. Sparhawk.*

1260. OPLAND, EVENBY J. Herredsskogmesterinstitutionen og dens betydning for et rationalt skogbruk. [The office of Herred Forester and its relation to a rational forest utilization.] Tidsskr. Skogbr. 28: 210-218. 1920.—The author lays stress on the fact that Norway will always receive much revenue from her forests, that the surest way of safeguarding the forests is by educating the people and by accumulating fundamental knowledge. Until this is assured there must be Government regulation and supervision, for which the office of Herred Forester has been instituted. It is the function of this office to supervise law enforcement, to insure that only properly informed persons prescribe the cuttings, that capable men are put in charge, and that the proper kind of information is gathered. About one-half of the country has now accepted this measure.—*J. A. Larsen.*

1261. OPPERMAN, A. Tilvirkning og anvendelse af Dansk Gavntæe. [Sawing and utilization of Danish woods.] Forst. Forsøgsv. Danmark 5: 301-342. Fig. 1. 1920.—The object of the investigation was to determine how dimensions, shape, and structure affect the amount and quality of the yield. To this end the different parts of the tree were selected in order to determine the sizes and the amounts which may be sawed out for stock to be used for staves, implement handles, shoe bottoms, wagons, etc.; also for lumber of different descriptions. The results of the investigations are given in great detail in tabular form.—*J. A. Larsen.*

1262. ORRE, S. Blinkning i Namdalen. [Marking in Namdalen.] Tidsskr. Skogbr. 28: 246-256. Pl. 5. 1920.—The author describes the results of early marking in the northernmost forests in Norway, and points out the bad results from unscientific marking. The forests are chiefly of spruce (*Picea excelsa*) and birch (*Betula odorata*).—*J. A. Larsen.*

1263. PACK, A. N. Wooden shingles or substitutes. Amer. Forestry 27: 231-237. 13 fig. 1921.

1264. RAMBLOW, A. D. Nutzungen des Waldes unter besonderer Berücksichtigung der mit forstlichem Nebenbetriebe verbundenen landwirtschaftlichen Betriebe. [Uses of the forest with special regard to the relation between farm and forest management.] Illus. Landw. Zeitg. 41: 34-35. 1921.—The author gives a brief popular discussion of the utilization of the farm forest or wood-lot. Cut trees may be used for carriage poles, mine-timbers, sleepers, barrels, paper, poles, and facines; certain parts may be used for fire-wood and for local repairs. The forested tract may be used for pasture. Leafy twigs of poplars, aspens, willows, horn-beams, and other broad leaved trees, except alders, may be dried and used as fodder in winter, or the twigs only may be clipped off in winter and saved. Dried leaves, especially those of beech, may be used as bedding for animals. It is desirable to remove some of the beech leaves as they are usually so abundant as to interfere with reproduction.—*John W. Roberts.*

1265. RAVE. Forderungen zum Forstkulturgegesetz. [Need for forest law.] Zeitschr. Forst- u. Jagdw. 52: 302-305. 1920.—The need for increasing forest production suggests the enactment of laws governing the management of forest land. All forests which do not show a satisfactory volume and value production should be placed under state supervision. The plan points toward the socialization of forests. The basis for the recommendation is the average yield per acre for 1913 of 187.4 cubic feet on State forests as against 89.3 in private forests.—*Joseph S. Illick.*

1266. RIEMENSCHNEIDER. Die Hohlspatenpflanzung bei der Fichte und der Hallimaschpilz. [Planting spruce with hollow spade and the "Hallimasch" fungus.] Deutsch. Forst-

zeitg. 36: 165. 1921.—With this method of planting, losses due to the fungus *Agaricus melleus* are very much more serious than with the method of planting in prepared spots. The latter method also results in thriftier plants and more rapid height-growth, therefore is cheaper in the long run even though the first cost is greater. Douglas fir is most resistant to the fungus, followed by larch, white fir, pine, and spruce.—W. N. Sparhawk.

1267. RUBNER. Die Spätfroste und die Verbreitungsgrenzen unserer Waldbäume. [Late spring frosts and limits of distribution of forest trees.] Forstwiss. Centralbl. 43: 41-49, 100-114. 1921.—The distribution of tree species is governed, with few exceptions, by their climatic and edaphic requirements and by their ability to compete with other species, depending on their tolerance, rate of growth, and longevity. No one factor can be designated as the decisive one, but, in the author's opinion, ability of a species to withstand late spring frosts is frequently of more importance than most other factors. The relative frost-hardiness of different trees depends upon the inherent hardness of the species, upon the time when new growth begins, upon the ability to put out new shoots in case the first ones are killed, and also upon the form of the stand in which they occur. Topography is a very important factor because with it varies the probability of frosts, the period of new growth of a given species, and the amount of snowfall and its duration. Late frosts are the decisive factor governing both the horizontal and vertical distribution of a number of native and introduced species of central Europe. The distribution of Scotch pine, fir, spruce, birch, pedunculate and sessile oaks, ash, lindens, hornbeam, maple, and others is discussed.—W. N. Sparhawk.

1268. RUDEN, IVAR. *Picea pungens*. Dens anvendelighet i vort skogbruk. [*Picea pungens* and its suitability for use in Norwegian forestry.] Tidsskr. Skogbr. 29: 39-47. 1921.—The Colorado blue spruce plantations in Norway show promise that the species will help solve the problem of extending the timberline northward and upward where native trees do not thrive. It may also be used to advantage on the poorer wind-swept sites near the coast. The plantations are now from 13 to 20 years old and are everywhere on precarious sites superior to the other species.—J. A. Larsen.

1269. SCHÜPFER. Die Nadelholzwälder der Welt und die Aussichten der Holzwareindustrie. [The coniferous forests of the world and the outlook for wood manufacturing industries.] Forstwiss. Centralbl. 43: 152-154. 1921.—Modern civilization, more than any previous one, depends on timber supplies. Wood, and especially coniferous wood, has become one of the great staple articles of world trade. Conifer forests are largely confined to the northern hemisphere, and the greatest areas are in the Scandinavian region and in North America, the great eastern white-pine forests of the latter being exhausted. The Canadian forests are extensive but very poorly stocked, due to forest fires. The southern pine forests are enormous, but are being cut very rapidly. Within a short period, British Columbia will be the greatest center of the world's lumber industry, and the American Pacific coast will be the only serious competitor of Finland and Sweden. Suggestions that Siberia will become an important factor should not be taken seriously. Austria-Hungary is not a factor and much of European Russia's large forests are economically inaccessible. The conclusion is that the world's supplies of economically exploitable softwoods are much more limited than has been generally believed and that it is necessary not only to exploit what remains but also to grow more.—W. N. Sparhawk.

1270. SCHÜPFER. [Rev. of: SCHWAPPACH, ADAM. Mitteilungen aus den forstlichen Versuchswesen Preussens. Untersuchungen über die Zuwachsleistungen von Eichenhochwaldbeständen in Preussen. Zweiter Teil. (Growth of oak stands in Prussia.) J. Neumann: Neudamm, 1920.] Forstwiss. Centralbl. 43: 192-194. 1921.—Schwappach's oak yield tables of 1905 were based on single measurements of a large number of sample plots of various ages, and therefore give only approximate values. Since then the plots have been remeasured, and curves constructed on the basis of the actual growth on them. The new height curves rise considerably above the old ones, but the basal area and volume curves do not because, with the silvicultural methods best adapted to oak,

—light thinnings in youth, followed by heavier ones,—the basal area increases very little after about the 100th year. The volume curves of 1920 at the 200-year point are considerably below those of 1905, due principally to the fact that a much greater volume is removed in thinnings than was shown by the earlier curves. The total increment, including thinnings, is not very different. The value-increment is probably considerably greater with the heavy thinnings. The question as to the most effective kind and density of understory under the oak is not yet answered.—*W. N. Sparhawk.*

1271. SEEHOLZER. Die Naturverjüngung auf den Juraböden der Oberpfalz. [Natural reproduction on the Jura of upper Palatinate.] Forstwiss. Centralbl. 43: 6-18. 1921.—In this region, natural reproduction is much safer and more certain in producing a valuable stand than artificial reproduction, either by seeding or planting. The climate is rather dry, periods of drought are not uncommon, and the soil dries out and heats very quickly if exposed to the sun. It is necessary, therefore, to use a silvicultural system which will conserve moisture and at the same time prevent undue root competition between seedlings or between seedlings and old trees. The system used must also favor abundant seed reproduction, must maintain the soil in such condition that seeds will germinate and the seedlings establish themselves, and must retain the mixed form of stand,—spruce with from 10 to 50 per cent of beech, fir, and pine, according to local conditions. These requirements are best met by the selection system, occasionally using the strip selection method, and being careful to keep openings rather small. Cuttings should in most cases proceed regularly from the north side of the stand toward the south, in order to conserve moisture. Since the application of the system varies with each variation in local conditions, it requires a very intensive control by a trained forester.—*W. N. Sparhawk.*

1272. SIM, T. R. Timber trees for commercial culture. Further species that have been tried in South Africa. South African Jour. Indust. 4: 161-165. 1921.

1273. SIM, T. R. Tree planting for the farm. I. Selecting the site for the plantation. South African Jour. Indust. 4: 218-223. 1921.

1274. SKÖIEN, OLAF. Antal aar paa sidste Cm. [The number of years' growth on the last centimeter of radius.] Tidsskr. Skogbr. 28: 223-227. 1920.—Mistakes and errors which result from the use of SCHNEIDER's formula are pointed out. Measurements on rapidly growing trees will give a very short period as compared with the slower growing trees and those on poor sites. Irregularities in the periodic growth are thereby overlooked and the arithmetical means of the number of years in the last centimeter on the radius for trees in the same diameter class introduce other errors. The use of the distance for each ten years' growth overcomes these difficulties.—*J. A. Larsen.*

1275. STANG, THOMAS. Vest-Amerikanske traeslag for Norges Skogbruk. [West American trees for use in Norway.] Tidsskr. Skogbr. 28: 257-277. Pl. 1-8., fig. 1-8. 1920.

1276. VANDERYST, HYAC. Contributions à l'étude du palmier à huile au Congo belge: 5°. La récolte des produits de l'Elaeis. [Contributions to the study of the oil palm in Belgian Congo: 5. The collection of the products of Elaeis.] Bull. Agric. Congo Belge 11: 22-36. Fig. 5-8. 1920.—*Elaeis* is one of the most useful trees of the Congo. The natives collect the sap, which by spontaneous fermentation is transformed into a more or less alcoholic drink known as Malafu, or palm wine; the leaves are used for basket work and the fruits furnish oils of great value. The methods employed by the natives in collecting these products are discussed, and the danger incurred by them of contracting sleeping sickness.—*E. M. Doidge.*

1277. VANDERYST, HYAC. Contributions à l'étude du palmier à huile au Congo belge: 6°. Le tronc ou stipe de l'Elaeis. [Contributions to the study of the oil palm in Belgian Congo: 6. The trunk of Elaeis.] Bull. Agric. Congo Belge 11: 37-53. Fig. 9-12. 1920.—In the neighborhood of the mission at Leverville the trunk of *Elaeis* attains an average diameter of 33.6

cm., which is in excess of the average diameter assigned to it by other writers; the maximum observed was 36.7 and the minimum 28.8 cm. A diameter less than 25 cm. has not been observed. Other things being equal, *Elaeis* develops better and more vigorously on a pronounced slope than on a slight slope or on flat ground.—*E. M. Doidge*.

1278. VENDELMANS, H. Making a forest to order. *Sci. Amer.* 124: 232, 240. 4 fig. 1921.—A method of forestry by preculture, as practiced in Europe, is described. The method consists of preparing the land, improving and appropriating it to the intended tree planting, which is then executed at the lowest possible cost. It aims to destroy the natural vegetation, to break up and aerate the soil and insure drainage, to improve the soil and add to its mineral content by applying lime and chemicals, to improve further its physical condition by increasing the power for retaining water, to enrich it with available nitrogen and with a bacterial flora by using green manures, and to make the agricultural crop which follows the green manure pay for the expenses and provide an appropriate medium in which to plant at small cost with the maximum percentage of growth.—*Chas. H. Otis*.

1279. VIKHAMMER, P. Granfro i Troms Fylke. [Spruce (*Picea excelsa*) seed in the Troms district.] *Tidsskr. Skogbr.* 28: 218-220. 1920.—Tests were made of the number of seed per cone, germination per cent, and number of young trees per cone of Norway spruce at the northern limit of its distribution (69° 21' north latitude in Norway). There were from 85 to 164 seeds per cone, a germination of from 5.7 to 34.2 per cent, and from 0 to 10 plants per cone.—*J. A. Larsen*.

1280. WEBER, HEINRICH. Die deutsche Holzbewirtschaftung während des Weltkrieges. [Handling of German wood supply during the World War.] *Allg. Forst- u. Jagdzeitg.* 95: 89-99. 1919.—A complete review of the German wood supply situation during the World War is presented. Germany has been a wood-importing country since 1870. At the outbreak of the war 15 million cubic meters of wood were imported to meet the demands of industries. The German forests in 1913 produced 28.66 million cubic meters of work wood, the consumption of work wood being 43 million. The imported wood came from Russia (52.5 per cent) Austria-Hungary (27.6 per cent), Norway and Sweden (7.3 per cent), U. S. A. (7.1 per cent), and Finland (3.1 per cent). The enemy blockade was so complete and effective that practically all importation ceased. It became necessary to meet all demands from the forests at home and in occupied territory. This compulsory transfer of operations meant a complete reorganization of the wood-supply equipment. In order to meet the situation, there was created a division of raw material in the Department of War. This sufficed for the first 2 years of the war when most of the wood was obtained from the enemy forests in occupied territory. Much wood was obtained from the territory occupied by the army of the East. In the summer of 1916 a marked change took place in the conduct of the war. Excessive demands came from all sides for many different forest products. The situation became so critical that a central organization had to be created. Soon it was divided into 2 sections, and by 1917 there were 7 separate sections each with a distinct line of work. Three periods of development in satisfying the wood-supply of the German army are recognized, (1) from the beginning of the war to the spring of 1916, (2) from the spring of 1916 to December 1916, and (3) from December 1916 to the end of the war. Special modifications of cutting and logging methods were ordered and in spite of the heavy drain upon the forests the latter remain in a fairly good condition.—*Joseph S. Illick*.

1281. WEBSTER, A. D. Brown oak timber. *Gard. Chron.* 69: 164. 1921.—This is a strictly English product confined to the midland and eastern counties. The best timber has been sent to America for thin veneers, 30-40 to the inch, on account of its great value. The dining room of the White House at Washington is entirely panelled with it. The cause of the change in color from white to a rich brown or chestnut is uncertain but is generally ascribed to certain properties in the soil. The use of the wood for panelling has been known from early Tudor times, although only since William the Stadholder came from Holland in 1685 has the most decorative method of wall panelling been adopted. Previous to that time

and up to the Jacobean period panels were small. The best English examples of the early use of this timber are found in the Royal Chapel and Banqueting Hall in the Tower of London, St. Paul's Cathedral (from Welbeck in 1695), and the Cloister of Durham Cathedral.—*P. L. Ricker.*

1282. WEBSTER, A. D. Lumbering in British Columbia. *Gard. Chron.* 69: 126. 1921.—A report of a 3-weeks' visit to the lumbering camps is presented, including a brief description of the camps and operating and transportation methods.—*P. L. Ricker.*

1283. WHITFORD, H. N. Tropical forests. *Sci. Amer. Monthly* 3: 267-270. 1921.

1284. WILD, A. D. Wie der Nordsaumplenterschlag sich von selbst einführt und sonstiges aus dem Revier Zabern. [How the north-border-selection cutting originated and other notes from the Zabern district.] *Forstwiss. Centralbl.* 43: 161-172. 1 pl. 1921.—Wild discusses the history of the forests of the Zabern district, which are composed of a considerable variety of stands, including oak, beech, fir, spruce, and pine, pure and in various mixtures. Various silvicultural methods are used, but different forms of selection cutting, with natural reproduction, predominate.—*W. N. Sparhawk.*

1285. WIMMER. [Rev. of: REBMANN. Der Anbau von Walnussbäumen und amerikanischen Nussbaumarten im Walde. (Growing walnut trees and American nut trees in the forest.) 68 p., 4 fig. J. Neumann: Neudamm, 1920.] *Forstwiss. Centralbl.* 43: 191-192. 1920.—This is a very thorough and careful treatise on the cultivation of *Juglans regia*, *J. nigra*, *J. cinerea*, *Carya alba*, *C. porcina*, and *C. tomentosa* by a forester who has studied these species for decades.—*W. N. Sparhawk.*

1286. ZELLER. Ansichten über Buchenverjüngungen. [Notes on reproduction of beech.] *Deutsch. Forstzeitg.* 36: 140-142. 1921.—The author's experience indicates that cuttings in beech forests can be made every year, without reference to the occurrence of moist years, and that satisfactory beech reproduction will follow in due time. He believes that young beech seedlings do not need overhead shade,—that they are more thrifty without it.—*W. N. Sparhawk.*

GENETICS

GEORGE H. SHULL, *Editor*

JAMES P. KELLY, *Assistant Editor*

(See also in this issue Entries 1112, 1125, 1127, 1153, 1176, 1392, 1405, 1410, 1424, 1468, 1553, 1646)

1287. ANONYMOUS. Ratio of sires and dams. U. S. Dept. Agric. Weekly News Letter 8: 8. 1920.—A tabulation of more than 200,000 head of stock kept for breeding purposes on more than 2000 representative farms gave the following average number of females to each male: Cattle 18.9, horses 16.9, swine 11.5, sheep 37, goats 26.6, chickens 23.3, other poultry (geese, ducks, turkeys) 8.5.—*Sewall Wright.*

1288. ANONYMOUS. [Rev. of: CHEVALIER, A. Sur l'origine des pommiers à cidre cultivés en Normandie et en Bretagne. (On the origin of cider apples cultivated in Normandy and Brittany.) *Compt. Rend. Acad. Sci. Paris* 171: 521-523. 1920 (see Bot. Absts. 8, Entry 377; 9, Entry 1311).] *Gard. Chron.* 68: 223. 1920.

1289. ANONYMOUS. Dwarf maize. [Rev. of: KEMPTON, J. H. A brachytic variation in maize. U. S. Dept. Agric. Bull. 925. 28 p., 19 pl., 8 fig. 1921 (see Bot. Absts. 8, Entry 1923).] *Gard. Chron.* 69: 254. 1921.

1290. ÅKERMAN, Å. Untersuchungen über Bastarde zwischen *Epilobium hirsutum* und *Epilobium montanum*. [Investigations on hybrids between *Epilobium hirsutum* and *Epilobium*

montanum.] Hereditas 2: 99-112. 8 fig. 1921.—Hybrids between species of *Epilobium* have been reported as occurring among wild plants and are frequently referred to in systematic literature. In such cases it is difficult to determine, from field observations, what the parent species are in particular cases. Artificially controlled hybrids have been produced between *E. hirsutum* \times *E. montanum* by COMPTON. LEHMANN has produced hybrids by crossing *E. parviflorum* with 3 other species. Reciprocal crosses were different in a number of characters. When *E. parviflorum* was used as female parent the hybrid was quite sterile, no good pollen being produced, while the reciprocal cross produced about 50 per cent good pollen and some mature seed. There were other reciprocal differences. In the F_2 generation obtained from *E. palustre* \times *E. parviflorum* a large range of independently segregating characters was obtained. The author made reciprocal crosses between *E. hirsutum* and *E. montanum*. Plants of the parent species were grown simultaneously. At the flowering stage the *E. montanum* plants were 60-70 cm. tall while the adjacent F_1 hybrids were dwarfs, about $\frac{1}{3}$ - $\frac{1}{2}$ as tall and considerably smaller than the smaller parent. The hybrids in other respects were a reproduction of the *E. montanum* plants, with no evidence of the *E. hirsutum* parent. The adjacent parent species grew and flowered normally while the dwarf F_1 plants failed to produce flowers. Now and then F_1 plants more robust than the others appeared, on which the buds reached a higher stage of development than was generally the case. Compton, reporting on this cross, noted the same peculiarities. The reciprocal cross, *E. montanum* \times *E. hirsutum*, produced F_1 plants of the more vigorous, robust type only. Of the 1919 cultures some of the potted plants were placed in the shade of a tree to prevent too rapid loss of moisture. The stems of these plants grew much more rapidly than the remainder left in the open garden. A more nearly normal development ensued and a few flowers opened, on which the petals were larger than those on the parent. Following this, specimens of hybrids and parents were placed in the north window of the laboratory where the hybrids developed much more rapidly than those left in the garden. The flowers opened completely, the petals resembling those of *E. hirsutum*. In 1920 this experiment was repeated with the same results. The author was unable under these conditions to distinguish reciprocal hybrids. Excessive and scant water supply to shaded plants and to plants in sunlight did not alter the results, indicating that the better development of the shaded hybrids was due to reduced illumination. Backcrosses of these F_1 plants to the parents produced abundant seed, which, however, produced only a few seedlings, many of which were weak and soon died as was true of some in the F_2 , *E. palustre* \times *E. parviflorum*, reported by Lehmann. Approximately 100 plants of the backcross remained alive and showed a large range of variations and character combinations which does not indicate close linkage of genes. Attempts to find a bacterium as the cause for the dwarfing in F_1 gave negative results. Results show a distinct difference between the *E. montanum* \times *E. hirsutum* hybrid produced artificially and the wild form of *Epilobium* supposed to be the field hybrid between these 2 species.—J. L. Collins.

1291. ALDERMAN, W. H. Experimental work on self-sterility of the apple. Proc. Amer. Soc. Hort. Sci. 14: 94-101. 1917 [1918].—The investigation was begun in 1912. Previous investigation in apple pollination and sterility consisted mainly in studies of bloom clusters enclosed in paper sacks and, for cross-fertilization, emasculation had usually been practiced. Four possible sources of error enter into such tests: (1) Temperature and humidity conditions within paper sacks are abnormal; (2) individual flowers or clusters of flowers were studied without regard to the remainder of the tree; (3) emasculation may produce a decidedly abnormal condition; (4) it has not been shown that pollen from other trees of the same variety may not prove effective even though a single flower or single tree is self-sterile within itself. To eliminate these possible sources of error whole trees were enclosed in cheese-cloth or muslin frames.—The temperature was less variable within the muslin-covered frames than without, being 1-2 degrees higher at night and 2-4 degrees lower on bright days; on cloudy days there was very little difference. The humidity was slightly higher within the frames. In a comparison between muslin-covered frames and paper bags, the latter gave the better results. A summary of 3 years' work with Rome Beauty, York Imperial, and Wagener using pollen from another tree of the same variety shows no advantage over the use of pollen from the same tree.

Normally, not as large a percentage of blooms set fruit in Rome Beauty as in Wagener or York Imperial. Under orchard conditions the set in Rome Beauty is 4.46 per cent, whereas in York Imperial it is 7.87 and in Wagener 8.50.—The relative sterility of 2 varieties may not be judged by a direct comparison of the percentage of fruit set on each, but rather by a comparison of such set of fruit to the normal set of the variety. In the same way the efficiency of a mutual pollenizer may not be judged by a direct comparison of its effects upon 2 varieties, but rather by a comparison to the normal set of each. While none of the varieties given in the table are entirely self-sterile, they are greatly benefited by cross-fertilization. For Rome Beauty the percentage of set was increased $3\frac{1}{2}$ times, York Imperial 14 times, and Wagener 7 times. The size of individual fruits was increased by crossing; for Rome Beauty the increase over the size of self-pollinated fruits was 27.8 per cent, and for York Imperial 42.7 per cent. In 1914 and 1915 tests the set of fruit from emasculated buds was more than double that from buds not emasculated. Leaving calyx and corolla intact, removing corolla only, or removing both calyx and corolla appeared to make no difference in the results. The probable explanation of increased activity in emasculated blooms may be found in the protection it affords against superabundant pollination by the blooms' own pollen. Probably self-pollination frequently occurs naturally before artificial cross-pollination is brought about. Tubes of foreign pollen must then compete with tubes of the flowers' own pollen, with the result that chances of cross-fertilization are lessened.—A table of seed production shows that there are from 2 to 6 times as many seeds in the crossed fruits as in the selfed ones.—The possible presence of toxic secretions from stigmas was investigated, over 200 tests being made in which pollen of several varieties was germinated in stigmatic extracts from the same variety or other varieties. No toxic action was discovered. Thus it is evident that sterility is not a result of inhibition of pollen germination by toxins.—In a 1915 test of the value of cross-fertilization 6 hives of bees were placed in a section of a Rome Beauty orchard, and blooming branches of other varieties were fastened upright in pails of water suspended in the trees; 16 trees were observed. At some distance 16 similar trees were used as a check. The bee section produced more than twice as much fruit as did the check section, indicating clearly the value of bees in an orchard. The bee plot more thoroughly self-fertilized than the rest of the orchard would probably have shown some gain, but it is believed that the gain was due primarily to the cross-fertilization that must have taken place.—C. S. Crandall.

1292. ALTENBURG, EDGAR. Interference in *Primula sinensis*. Amer. Nat. 55: 78-80. 1921.—Upon recalculating the linkage data presented in a former paper (Genetics 1: 354-366. 1916), the writer finds, by correcting an error of calculation, that they indicate interference of about the same degree as found in *Drosophila*. Only plants with red stigmas were used in this calculation. The total crossing over in the 2 regions was 11.2 and 36.6 per cent; observed double crossovers, 2.9 per cent; coincidence, $2.9 \div 4.1$, or 0.7; total number of individuals, 1876.—E. G. Anderson.

1293. AUCHTER, E. C. A preliminary report on apple and pear breeding in Maryland. Proc. Amer. Soc. Hort. Sci. 17: 19-32. 1920 [1921].—Pear crosses were made in 1905 and in each succeeding year, except 1915, to and including 1917. The aggregate of seedlings grown was 1368, representing 10 of the 12 years. Ten varieties appear as parents in 28 crosses representing 17 parental combinations. Kieffer was the female parent in 10 crosses, for which 5 varieties supplied pollen, and served as the male parent in 8 crosses on 4 varieties. The report of results is deferred pending fruiting of the seedlings.—Apple crosses were made in each of the 12 years 1906-1917. Sixteen crosses of 1910-1911 yielded no seedlings. The 827 seedlings grown represent 22 varieties used as parents in 17 combinations in 45 crosses. This report considers 166 seedlings, from the crosses of early apples in 1907, that have fruited; they represent 11 parental combinations. A table gives, for each group, flowers pollinated, fruits picked, seed production, seedlings transplanted, number fruited, number dead, and number not yet fruited. It appears that 2940 pollinations gave 334 fruits,—11.36 per cent of the pollinations successful. The average seed content was 4.57. Germination of seeds of the different groups ranged from 0 per cent for 5 seeds from the cross Early Ripe \times Williams, to 92.73 per cent for

the cross Williams \times Early Ripe. The average percentage of germination for all groups was 47.31. Of the 493 seedlings, 459, or 93.1 per cent, were permanently planted and of these 425 are living at the end of the 13th year; they represent 86.2 per cent of the germinations and 92.6 per cent of the seedlings permanently planted.—A 2nd table gives details of fruit descriptions, showing distribution as to form, size, color, flavor, and season. Regarding shape and length, illustrations are drawn from the table showing "that it was not so much a matter of either parent transmitting most of its characters, but that rather certain factors or characters in certain varieties were the dominant ones and were transmitted regardless of which parent the certain variety happened to be." Critical study of color transmission is deferred, "but in general it can be seen that the factor or factors which carry color (red, pink, or carmine) are dominant over the factor or factors carrying yellow." "In this case again the fact that red color seems to be dominant, appears to be more important and significant than the question of whether the male or female parent is the more prepotent in this respect." Of 19 seedlings from 2 yellow parents,—Yellow Transparent \times Early Ripe,—1 bore a red-striped fruit and 1 a solid red fruit indicating that the parents, one or both, are heterozygous for color.—None of the parent varieties bear sweet fruits, but several seedlings with sweet fruits appear in several crosses. "These are not very numerous, however, and probably the factors carrying sweetness are recessive. In nearly every case there are higher percentages of acid to sub-acid fruits than there are of mild sub-acid or nearly sweet. This holds again regardless of which parent is the male or female and suggests that the factor or factors which carry acid or sub-acid are dominant over those carrying mild sub-acid or nearly sweet flavor."—"The range of the ripening period did not extend over two weeks on either side of the ripening period of the parents and, in general, most of the seedlings of a certain cross ripened during the same period as the parents."—Of the 166 seedlings 24, from 6 crosses, are recorded as very promising, and 11 additional ones, from 3 of these crosses, are reserved for further testing. The very promising seedlings are: Yellow Transparent \times Williams, 6 of 29; Yellow Transparent \times Red June, 2 of 14; Yellow Transparent \times Early Ripe, 1 of 19; Williams \times Early Ripe, 4 of 35; Williams \times Yellow Transparent, 10 of 51; and Early Ripe \times Yellow Transparent, 1 of 13.—In 1907 seedlings from open-pollinated fruits were grown as follows: From Yellow Transparent 148, Williams 89, and Early Ripe 9. Ninety of these had fruited and 1 each from Yellow Transparent and Williams were recorded as promising. [See also Bot. Absts. 9, Entry 785].—*C. S. Crandall.*

1294. BABCOCK, E. B. Bud selection and the frequency of mutations. *Proc. Amer. Soc. Hort. Sci.* 17: 40-44. 1920 [1921]. Bud variations in horticultural plants are discussed and it is pointed out that very little is known concerning the frequency of their occurrence. Both species and varieties, however, are known to differ in regard to the frequency with which bud mutations occur, and therefore it may be expected that more variations will occur in certain fruit trees like the citrus than in the deciduous fruits. Examples are given of plants which produce frequent mutations and of those which produce few or no mutations; the bearing of the *Drosophila* investigations on the subject of bud mutations is briefly discussed. In closing the writer discusses the tendency of nurserymen to advertise stock grown from known high producers without experimental proof as to their superiority, and advocates the carrying on of more experimental work in this field.—*Richard Wellington.*

1295. BABCOCK, E. B., AND J. L. COLLINS. Interspecific hybrids in *Crepis*. I. *Crepis capillaris* (L.) Wallr. \times *C. tectorum* L. *Proc. Nation. Acad. Sci.* 6: 670-673. 1920.—*Crepis tectorum* has 4 pairs of chromosomes, while *C. capillaris* has 3 pairs; the F_1 hybrids have 7 chromosomes. Forty of these hybrids were raised as seedlings. None produced true leaves, but they remained for months in the cotyledonary stage before perishing; the tissues were found to be in a chaotic condition.—*John Belling.*

1296. BALTZER. [German rev. of: HERTWIG, PAULA. Abweichende Form der Parthenogenese bei einer Mutation von *Rhabditis pellio*. Eine experimentelle cytologische Untersuchung. (Aberrant form of parthenogenesis in a mutation of *Rhabditis pellio*. An experimental cytological study.) *Arch. Mikrosk. Anat.* 94: 303-337. 1920.] *Zeitschr. Indukt. Abstamm.-u. Vererb.* 25: 254-255. 1921.

1297. BALTZER. [German rev. of: HERTWIG, PAULA. Haploide und diploide Parthenogenese. (Haploid and diploid parthenogenesis.) Biol. Centralbl. 40: 145-174. 1920 (see Bot. Absts. 6, Entry 1695).] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 180-181. 1921.

1298. BALTZER. [German rev. of: LEVY, FRITZ. Die Kernverhältnisse bei parthenogenetischen Fröschen. Ein Beitrag zur Physiologie und Pathologie der Zelle. (The nuclear relations in parthenogenetic frogs. A contribution to the physiology and pathology of the cell.) Sitzungsber. Preuss. Akad. Wiss. Berlin 1920:417-425. 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 181-182. 1921.

1299. BARKER, E. E. Relacion existente entre el cruzamiento de plantas y la agricultura. [The relation existing between crossing of plants and agriculture.] Rev. Agric. Puerto Rico 5: 4-12. 1920.—A brief sketch is presented of the development of genetics and its practical application to plant breeding problems with suggestions for specific application to Porto Rican problems.—E. E. Barker.

1300. BATESON, W. Genetic segregation. Amer. Nat. 55: 5-19. 1921.—There is a large group of cases in plants in which the reduction division cannot be coincident with segregation.—(1) In *Matthiola*, all the pollen-grains of the double-throwing singles carry the factor for double, while some of the egg-cells have the factor for single, others the factor for double. The same is the case, *mutatis mutandis*, with the factors for white and cream petals. The pollen-grains are uniformly sound.—(2) A comparable difference between pollen and egg-cells has been demonstrated in *Oenotheras*, though here there are many empty pollen-grains.—(3) In *Campanula carpatica*, all the pollen-grains of a certain hermaphrodite plant, heterozygous for blue flower, carry the factor for femaleness; and more of them carry also the factor for white flower. The pollen-grains are sound.—(4) In heterozygous single *Petunias*, all the pollen-grains carry the dominant factor for singleness; the pollen-grains are sound.—(5) *Begonia Davisii* is a wild form with single flowers. All the pollen-grains carry the factor for double flowers. The pollen gives all doubles when used on double varieties; single is dominant. These pollen-grains are sound.—(6) A recessive strain of *Linum usitatissimum*, from a cross, had anthers with only occasionally a few good pollen-grains. Pollinated from 3 other varieties of flax, only recessives were produced. Thus these 3 flaxes were heterozygous for the factor in question, and all their pollen bore the recessive factor.—(7) A difference in the linkage value for the microspores and megaspores of *Primula sinensis* is due to somatic segregation.—(8) The production of certain periclinal chimeras is due to somatic segregation.—(9) In crosses of rogue peas with the normal forms, the factors peculiar to the normal form are left behind in the lower parts of the F_1 plants, the upper parts being pure rogue.—(10) In *Funaria hygrometrica*, from the perigonal leaves around the antheridia, plants bearing only antheridia were regenerated; while regenerations from leaves surrounding the archegonia produced monoecious plants only. Thus somatic segregation can occur even in a haploid form.—(11) A variegated *Adiantum capillus-Veneris* produced only green prothallia. The young ferns raised from these prothallia were green, white, or variegated. Hence somatic segregation must have occurred in the haploid tissue of the prothallia.—John Belling.

1301. BAUR, E. [German rev. of: HAGEM, OSCAR. Arvelighets-Forskning. En oversigt over nyere resultater. (Genetical investigation. A review of new results.) 317 p. Aschehoug & Cie.: Kristiania, 1919.] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 254. 1921.

1302. BAUR, E. [German rev. of: KRONACHER, C. Allgemeine Tierzucht. Zweite Abteilung. Fortpflanzung-Variation und Selektion-Vererbung. Zweite, vermehrte und durchgearbeitete Auflage. (General animal breeding. 2nd part. Reproduction-variation and selection-heredity. Second enlarged and completely revised edition.) Parey: Berlin, 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 176. 1921.

1303. BAUR, E. [German rev. of: REINKE, J. Kritik der Abstammungslehre. (Critique of the evolution theory.) 133 p. Johann Ambrosius Barth: Leipzig, 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 178-179. 1921.

1304. BEACH, S. A. Fruit breeding in the northwest and its significance in horticultural development. *Proc. Amer. Soc. Hort. Sci.* 17: 13-19. 1920 [1921]. A general discussion is presented.—*J. P. Shelton.*

1305. BEMMELEN, J. F. VAN. Das Farbenmuster der mimetischen Schmetterlinge. [The color pattern of mimetic butterflies.] *Zool. Anzeiger* 52: 269-277. 1921.—The author says that one should be unprejudiced by the "mimicry hypothesis." Each group of animals must be considered by itself from the point of view of comparative morphology. The same evolutionary tendencies underlie evanescence or modification of color pattern in different families and this produces forms with superficial resemblances. The more usual character in a group is not necessarily the more ancestral; the 2 genera of monotremes are not derived from other mammals. Narrow "mimetic" wing and body occurs in several different families of butterflies, showing that hereditary fundamentals for this character are present in all. "Mimicry" once appearing may be of survival value, but natural selection is not a creative force. The loss of tails in females of *Papilio* is atavistic, for ancestral Lepidoptera have no tails. Females are more primitive although English writers regard "mimetic" females of *P. dardanus* as departures from the ancestral type produced by natural selection to resemble Danaids of the particular region in which they occur. Sex differences are not fundamentally different from other types of variation within species.—*P. W. Whiting.*

1306. BREITENBECHER, J. K. The genetic evidence of a multiple (triple) allelomorph system in *Bruchus* and its relation to sex-limited inheritance. *Genetics* 6: 65-90. 1921.—The author finds 4 types of the "four-spotted cowpea-weevil," *Bruchus maculatus*, Fabr., distinguished in the females by the body-colors, on the elytra and elsewhere, of red, black, white, and tan. In males, the color distinctions are not sufficiently marked to make the separation by the eye practicable in genetic experiments. Tan, which in females is the usual color of the wild beetles, is, in general, the color of all males. Sex-linked inheritance is not shown; on the other hand, sex-limited inheritance is as just explained. The "mutants," as the author terms all but the tan type of female, have frequently been found in cultures from various parts of the U. S. A. Each type is described. Each color is determined by a gene allelomorphic to each of the other color-genes, making a multiple allelomorph group of 4. This is demonstrated by 69 different matings, producing over 100,000 individuals. The order of dominance is red (dominant to all), black, white, tan; order of greatest fertility and vigor, black, red, tan, white; order of greatest size, black, tan, red, white. "There is a marked variation as regards color. . . . For the whites may approach the blacks and the reds may verge on the whites as well as on the tans."—*John S. Dexter.*

1307. BUCHANAN, J. ARTHUR. The Mendelianism of migraine. *Med. Rec.* 98: 807-808. 1920.—Heredity is defined in the Mendelian sense as applied to a disease and it is shown that migraine conforms to the definition. The material for the study was obtained at the Mayo Clinic and included 127 families with a total of 808 children. When both parents are migrainous all the children have migraine. When neither parent is migrainous but is of migrainous stock or if 1 parent only is migrainous, migraine appears among the children approximately in the ratio of 1:3. "There is no medication known that will alter" the course of the disease; "it is a distinct part of the patient's economy."—*Howard J. Banker.*

1308. BURCH, D. S. Pure-bred sires lead rapidly to improvement in female stock. *Jour. Heredity* 12: 45-48. *Fig. 32-34.* 1921.—The author describes results of the "Better sires—better stock" campaign of the Department of Agriculture [U. S. A.]. There has been a distinct increase in the ownership of pure-bred females among those enrolled in the campaign.—*Sewall Wright.*

1309. BURGEFF, H. Sexualität und Parasitismus bei Mucorineen. [Sexuality and parasitism in the Mucorineae.] *Ber. Deutsch. Bot. Ges.* 38: 318-323. 1921.—The author reviews his previous work on the Mucor parasite *Chaetocladium*, in which he showed the gall cell to be a mixture of protoplasm and nuclei of parasite and host, and in which he suggested that the

parasitism of *Chaetocladium* was related to the sexual process and had arisen as an attempt at hybridization. New data in support of this view are furnished by the *Mucor* parasite *Parasitella simplex*, of which the author has isolated the (+) and (-) races and obtained the zygospores. The formation of the gall cell is essentially similar to the process in *Chaetocladium*, except that in *Parasitella* the gall cell formed by a mixture of protoplasm of parasite and host becomes a storage organ in the form of a thick-walled body resembling an azygospore. Both (+) and (-) races of *Parasitella* parasitize both (+) and (-) races of most *Mucor* species, such as *Rhizopus nigricans*, *Mucor Mucedo*, and *M. heimalis*. *Parasitella* (+), however, parasitizes only the (-) race of *Absidia glauca*, and *Parasitella* (-) only the (+) race of this *Absidia*. A (-) race of *Chaetocladium* parasitizes only the (+) race of the same *Absidia* while parasitizing both (+) and (-) races of *Rhizopus* and *Mucor*. It is concluded that the hypothetical sexual substance which distinguishes the (+) and (-) mycelia of *Absidia* is in this case identical with the substance which induces parasitism; and that the parasitism of *Chaetocladium* and *Parasitella* is sex-limited in respect to *Absidia glauca*, but is not sex-limited in respect to *Rhizopus* and other genera. From the foregoing and from the fact that the (+) and (-) races of *Rhizopus* show imperfect hybridization reactions with the opposite sexes of *Absidia* it is further concluded that *Rhizopus* and *Absidia* possess like sexual complements but that *Rhizopus* has a special complement in addition which completes the sexual and parasitic complements of *Parasitella* (+) and *Parasitella* (-) and brings them into activity.—A. F. Blakeslee.

1310. CASTLE, W. E. A new type of inheritance. [Rev. of: SCHMIDT, JOHS. Racial investigations. IV. The genetic behavior of a secondary sexual character. Compt. Rend. Trav. Carlsberg Lab. 14^e: 1-21. Color pl. 1-5. 1920.] Science 53: 339-342. 1921.

1311. CHEVALIER, A. Sur l'origine des pommiers à cidre cultivés en Normandie et en Bretagne. [On the origin of cider apples cultivated in Normandy and Brittany.] Compt. Rend. Acad. Sci. Paris 171: 521-523. 1920.—For northwest France there have been described 500 to 1000 varieties of cider apples. The origin of these apples is not well known. It was formerly held that there was but a single Linnaean species, *Malus communis*, which included all cultivated crabs and apples, but excluded the *Malus* of eastern Asia and North America, which are very different species.—It appears necessary to divide *Malus communis* into 4 elementary species, capable of hybridizing among themselves and producing many fertile races which are sources of cultivated varieties. These species are *Malus acerba* Merat, *M. dasyphylla* Borkh., *M. praecox* Borkh. (these 2 are often united as *M. pumila* Mill.), and *M. prunifolia*.—The species *M. acerba* Merat (1815) includes apples growing spontaneously in the forests of nearly all of Europe. It had previously been designated under the name *M. spinosa* Rousset, Fl. Calvados (1806) and as *M. sylvestris*, Miller Gard. Dict. (1759). It is this last and oldest name that should be preserved.—All French authors have erroneously assigned the origin of cider apples to *M. acerba* and of table apples to *M. dasyphylla*. Examination of many varieties of cider apples, cultivated in the west, proves that none of them agreed with *M. acerba*, but they should be referred, like the varieties of our gardens, to *M. dasyphylla*, a species introduced from Spain. The explorer G. CAPUS discovered *M. dasyphylla*, occurring spontaneously in forests in Armenia and Turkestan, in 1881. Its culture extended from remote antiquity throughout the borders of the Mediterranean Basin and to-day it is found spontaneous in forests of Sicily and of Spain. The author observed it under similar conditions in the department of Alpes-Maritimes approaching an altitude of 3000 feet.—This species, represented in its native home by many races (*M. mitis*, *M. astracanica*, *M. Neidzwetzkyana*, etc.) has been the point of departure of edible varieties cultivated in Egypt under the 19th dynasty (JORET).—*M. praecox* is only another paradise or Saint-Jean apple used as a stock for dwarfing garden varieties. It came originally from the southeast in Russia and Asia Minor and appears to have been carried to Europe at the time of the Crusades. *M. prunifolia* originated in central Asia and its culture has spread on the one hand towards Russia and Siberia and on the other towards China and Japan.—The 4 species cited and their diverse races, still not well known, transformed by culture and by hybridizing among themselves in various degrees, have supplied the very numerous kinds of cultivated apples. [See also Bot. Absts. 8, Entry 377; 9, Entry 1288].—C. S. Crandall.

1312. CHILD, C. M. Studies on the dynamics of morphogenesis and inheritance in experimental reproduction. XI. Physiological factors in the development of the Planarian head. Jour. Exp. Zool. 33: 409-433. 33 fig. 1921.—Form of head, sense organs, and ganglia in regenerating Planaria depend on position of cut, physiological gradients, and other things, as well as heredity. What is inherited is a group of potentialities, certain ones of which are realized. Environment affects development through differential inhibitions. Normal development is uniform because conditions are uniform. Alterations initiated quantitatively produce qualitatively different results in morphology and physiology.—A. Franklin Shull.

1313. CLASSEN, K. Vererbung von Krankheiten und Krankheitsanlagen durch mehrere Generationen. [Heredity of diseases and of disease tendencies during several generations.] Arch. Rassen.- u. Gesellschaftsbiol. 13: 31-36. 1918.—A case of hereditary nervous weakness is reported which expresses itself through various grades of weaknesses and scoliosis of the vertebral column up to hereditary cerebellar ataxy. Anatomical symptoms consist in marked weakness and tremor of the limbs and facial muscles, and atrophy of the cerebellum. It does not begin before 50 years of age. The author gives considerable pedigree of the family showing the occurrence of various degrees of the disturbance. He suggests that modern experimental methods will explain the pedigree but does not venture a more detailed statement.—C. C. Little.

1314. CORRENS, C. Individuen und Individualstoffe. [Individuals and individual substances.] Ber. Senckenberg. Naturf. Ges. Frankfurt a. M. 47: 65-66. 1919.—Inhibitive substances responsible for self-sterility, failure of tissue transplantation, and substances responsible for individual odors are not necessarily due to the existence of individual substances. The conception of individual substances, in the sense of chemical materials peculiar to an individual and not connected with heredity, is inconsistent with modern studies of genetics. Individuality is the expression of a particular combination of heritable units acting in a particular environment.—R. E. Clausen.

1315. CRANDALL, C. S. An experience in self-fertilization of the peach. Proc. Amer. Soc. Hort. Sci. 17: 33-37. 1920 [1921].—Peach blossoms under control were subjected to 2 treatments: (1) Blossoms without apparent imperfections were pollinated, after emasculation, with pollen from the same tree; (2) blossoms were covered, without previous emasculation or hand-pollination. The trees used were seedlings from various crosses. Of 1207 hand-pollinated blossoms 36.2 per cent set fruits, of which 4.5 per cent had undeveloped embryos, and from which 43.25 per cent furnished trees for the orchard (1 tree to 6.38 flowers). Of 1230 covered buds not hand-pollinated 15.68 per cent set fruit, of which 31.41 per cent furnished trees for the orchard (1 tree to 20.5 buds). Individual variations are given, ranging from 11.68 to 61.42 per cent of blossoms setting fruits from hand-pollinations. Germinations ranged from 0 to 95.45 per cent. In the greenhouse 30 per cent of hand-pollinated blossoms yielded fruit, of which about 32 per cent had undeveloped embryos. From 1955 blossoms pollinated in 1915-1919 inclusive, 647 fruits were obtained (33.7 per cent), of which 441 (68.2 per cent) had developed embryos and from which 28 trees were obtained, furnishing 1 tree to 70 flowers. [See also Bot. Absts. 9, Entry 807.]-C. H. Connors.

1316. CROW, J. W. Breeding method with horticultural plants. Proc. Amer. Soc. Hort. Sci. 16: 19-24. 1919 [1920].—The author classifies plants for breeding according to method of propagation into the 3 major divisions with various subdivisions; examples are given of each. The principles of evolution as well as of plant breeding concerned in the work are noted; likewise the importance of mutations and subsequent pedigree tests. Lettuce has been found to be completely self-fertilized and celery nearly so. The author's work with onions shows that more progress can be made by selfing. Choice stalks are grown under glass and these are later hand-pollinated. It is noted that much of the disappointment experienced by breeders in the past has been due to the use of material carrying undesirable characters. Selfing is suggested as a means of purifying strains, subsequently crossing the purified strains to get desired combinations.—Many of the most important breeding problems depend on com-

binning vigor, or constitution, with other desirable characters, such as texture, size, color, and aroma. "It seems to be the fact that, in general, plants inherit type and constitution more largely from the mother than from the pollen parent." This conclusion is based on extensive work with strawberries. In practice the aim "is to get the individual which combines in fullest measure the constitution of one parent and the finer qualities of the other." In general these 2 qualities are not usually found united in the same individual. The author has evidence which suggests the desirability of using the higher quality plant as the ovule parent and the robust one as pollen parent since it is probable that "by this method it is possible to eliminate a very much larger percentage of seedlings in the first two or three years." On the other hand, if a robust plant is used as mother, a larger percentage of seedlings of robust constitution is obtained, which require years of time in testing. This method is suggested in hybridizing roses and fruits where hardiness is a desirable factor.—Regarding the inheritance of disease resistance, the generally accepted belief is noted that the difference in virulence of different strains of organisms may be equal to or greater than the difference in resistance of the cultivated plants; but the possibility is suggested of incorporating disease resistance of some varieties, in which it is general, into other varieties in which it is absent. The author also suggests the substitution of the word "isolation" for the commonly used term "selection," because the former term more nearly describes what is really practiced in improvement work. [See also Bot. Absts. 6, Entry 115.]—C. E. Myers.

1317. CURTIS, ROBERT S. The fundamentals of livestock judging and selection. 14 × 20.5 cm., 484 p., 190 fig. Lea & Febiger: Philadelphia, 1920.—A text-book of livestock judging; first edition appeared in 1915.—Sewall Wright.

1318. CUTTING, E. M. Heterothallism and similar phenomena. New Phytol. 20: 10-16. 1921.—The author reviews a number of papers pertinent to the subject of heterothallism, notably those of BLAKESLEE, BURGEFF, ATKINSON, GRUBER, and BURGER, on various Mucorine fungi. Similar phenomena observed by CLINTON and by MURPHY in *Phytophthora* spp., by FITZPATRICK in *Eocronartium*, by KNIEP and BENSUADE in various Basidiomycetes; by EDGERTON in *Glomerella*; and by TAUBENHAUS in *Sclerotium Rolfsii* are mentioned and discussed.—Charles Drechsler.

1319. CZUBER, E. Über Funktionen von Variablen, zwischen welchen Korrelationen bestehen. [Functions of variables between which correlations exist.] Metron 1: 53-61. 1920.—The author extends PEARSON'S formulae for the mean and standard deviation of an index to the general case, expressing the mean and standard deviation of any function in terms of the means, standard deviations and coefficients of correlation of its arguments.

$$\text{If } V = f(X_1, X_2, \dots, X_n)$$

$$M = \frac{1}{N} \sum (V) = f + \frac{1}{2} [f_{11}\sigma_1^2 + f_{22}\sigma_2^2 + \dots + f_{nn}\sigma_n^2 \\ + f_{12}\sigma_1\sigma_2r_{12} + f_{13}\sigma_1\sigma_3r_{13} + \dots + f_{23}\sigma_2\sigma_3r_{23} + \dots]$$

where $f = f(M_1, M_2, \dots, M_n)$, M_1 being the mean of X_1 , etc.

$$f_1 = \frac{\partial f}{\partial M_1}, \quad f_2 = \frac{\partial f}{\partial M_2}, \dots$$

$$f_{11} = \frac{\partial^2 f}{\partial M_1^2}, \quad f_{12} = \frac{\partial^2 f}{\partial M_1 \partial M_2}$$

$$\sigma_v^2 = f_1^2\sigma_1^2 + f_2^2\sigma_2^2 + \dots + f_n^2\sigma_n^2 + 2f_1f_2\sigma_1\sigma_2r_{12} + 2f_1f_3\sigma_1\sigma_3r_{13} + \dots \\ + 2f_2f_3\sigma_2\sigma_3r_{23}. \text{—John Rice Miner.}$$

1320. DEHORNE, LUCIENNE. Hermaphroditisme et scissiparité. [Hermaphroditism and schizogenesis.] Compt. Rend. Acad. Sci. Paris 169: 1110-1112. 1919.—It has long been known

that all buds in 1 chain of Polychaete *Myrianida* are of the same sex, and that male-producing and female-producing stocks are alike in structure and behavior. These stocks, however, are different in certain biological features. Thus, male-producing stock buds more freely, since 10-30 individuals are found in one male chain, rarely more than 5 in one female chain. Also, male-producing stock is slender, its tissues transparent, its nephridia indistinct like those of a young worm, while female-producing stock is stouter, and its tissues dense and opaque like those of the old animal. At the beginning of sexual reproduction (March) male chains are rare and female chains rather common, and there are many fragile specimens not yet budding. Non-budding individuals decrease and male chains increase in number as the season advances, until male chains are the more abundant. As autumn approaches, however, female chains are in the majority. Male chains collected in this latter period have fewer individuals and male-producing stocks are stouter than earlier in the season. As a male-producing *Myrianida* ages it approaches the condition of female-producing stock, acquiring a degree of intersexuality; that is, in a sense, it is a protandrous hermaphrodite. Changes are related to activity of metabolism, a high rate being associated with male-production, a lower rate with female-production.—A. Franklin Shull.

1321. DEMBOWSKI, JAN. Das Kontinuitätsprinzip und seine Bedeutung in der Biologie. [The principle of continuity and its significance in biology.] Vortr. u. Aufsätze Entwicklungsmech. Org. 21: 1-132. 1919.—In evolution, characters do not arise singly and successively; the whole organism is altered simultaneously. Neither evolution nor ontogeny can occur under constant conditions. Definitions of heredity involving parent and offspring are misleading, since heredity is a process and is continuous. Germ-plasm is the basis of continuity, but WEISMANN's theory employing a system of discrete objects violates the principle of continuity. The whole organism is composed of germ-plasm. Germ cells hold no independent place in the organism; there is no fundamental distinction between soma and germ-plasm, and no distinction between inherent and acquired characters. The capacities of living substance have no beginning, they simply exist. The development of any animal rests upon one phenomenon, namely, continuity of living substance with all its capacities and properties. The gene is not a unit of heredity, but a unit of development; the organism does not consist of such units, Mendelians merely recognize them. Progress in heredity will be made only when causes of phenomena are discovered, and such discoveries will come, not from hybridization experiments, but from study of general physico-chemical processes in ontogenetic development. Form in embryogeny is the result of the physico-chemical constitution; it is never a cause, being itself the effect of properties of living substance. Individuality of chromosomes is not proved by constancy of number, nor by constant size differences, nor by constant differences of form; and other evidences of individuality are of doubtful or negative value. Reduction division is asserted to result in all possible combinations of chromosomes, hence chromosomes must be equal, otherwise abnormalities would occur. The structures in the nucleus have no greater influence on development than do yolk and oil droplets. Facts supposed to show the importance of chromosomes may be otherwise explained. Chromosome theories of heredity have no significance. To find the material of heredity the chemistry of protoplasm must be studied. A developing embryo is a single continuous thing, its division into cells is of no significance. A formless, little-differentiated living substance, or plasma, is responsible for the course of development. The fate of blastomeres depends on their chemical and physical composition and that of their surroundings. Gastrulation is a physical phenomenon. The course of regeneration depends upon undifferentiated plasma, and the problem of regeneration is much like the problem of ontogeny, for germ-cells are not predestined elements but owe their capacities to their origin from plasma not involved in ontogeny. Regeneration is not a function of cells at the wound, but of the entire continuous organism, for cells at the wound would not, apart from the remainder of the whole, regenerate what they do. The principle of continuity harmonizes the contradictions of vitalism. It shows, for example, that an echinoderm egg is neither a machine nor a harmonious equipotential system. The statement of the vitalist that biology is an independent fundamental science violates the principle of continuity because it confuses phenomena with the method of investigation.—A. Franklin Shull.

1322. DUNLOP, W. R. Variation in the banana. Agric. News [Barbados] 20: 87. 1921.—The author notes a few earlier instances of variation in the banana. In 1895 a plant in Trinidad produced fruit low down on the side of the sucker (pseudostem). A Chinese banana, also in Trinidad, produced a double bunch of fruit, while there is an instance of a plantain from Bombay with 4 tassels of flowers. It is supposed that the 1st named peculiarity has a mechanical explanation while the 2 last-named phenomena are probably instances of the rare dichotomous branching of the Musas. From Barbados there is reported a bunch of bananas with twisted stem (fruit stalk), probably due to pathological disturbances. However, the most remarkable and interesting peculiarity observed is segregation of colors. The fruit of a variegated sucker observed by the author in Guatemala had the following composition and characteristics: Pure claret-colored (red) fingers, 20; pure green or yellow, 36; half-claret and half-green, 5; and red with green tip, 10. The claret fingers with green tips possessed the pronounced anterior rib with marked constriction at the tip common to the claret, but resembled the Gros Michel in size and, to a great extent, in color. The half-claret and half-green fingers resembled the Gros Michel in morphological characters. It is to be noted that the coloring of these fingers was definitely bilaterally asymmetrical.—J. S. Dash.

1323. DUNN, GRACE A. A comparative study of the two races of *Rhizopus nigricans*. Physiol. Res. 2: 301-339. 1 fig. 1921.—The author has studied chiefly the nutritive requirements of an individual (+) race and of an individual (-) race of *Rhizopus nigricans*, comparing them in respect to their physiological reactions under the terms "male" and "female." Using dry weight of harvest as the criterion, the best nutrient tested was a solution containing the following ingredients in the molecular concentrations indicated: KH_2PO_4 , 0.28; NH_4NO_3 , 0.0462; MgSO_4 , 0.0497; F_2PO_4 , trace; dextrose, 1.0. The 2 races tested gave about equal dry weight harvests in all the solutions employed where dextrose was the source of carbon.—The 2 races are shown to differ physiologically in 3 respects although "of course the male and female races of other strains of *Rhizopus nigricans* might not show these differences." (1) They behave complementarily in conjugating; (2) the "male" race produces a greater abundance of sporangia in good solutions than does the "female"; (3) the "male" race produces a greater dry weight harvest in solutions where glycerine is the source of carbon. This three-fold generalization is offered as a step toward an analysis of the physiological differences connected with the sexual difference between the 2 races.—A. F. Blakeslee.

1324. ERIKSON, GÖSTA. Gedanken zur Rotkleezüchtung. [Thoughts on red clover breeding.] Zeitschr. Pflanzenzücht. 8: 79-85. 1921.—The average red clover crop of Sweden, Norway, and Denmark is but 25-30 per cent of the maximum. This reduction is due in part to improper preparation of hard seed and to improper mixtures of clover with grasses used. The best farmers grow their own seed and sow it without preparation, often in an unhulled condition.—The writer observed that some place strains, in comparative trials, did comparatively much better in certain years, due mainly to differences of reaction toward soil moisture.—Certain colors, such as gray, characteristic of some strains, are apparently responsible for the easy invasion of certain parasitic organisms. Clover strains with certain colors of seeds, leaves, and stems are recommended.—Locally adapted place strains of red clover develop which often can not be grown successfully even in nearby localities. Red clover seed should not be exchanged or transferred geographically without critical knowledge of controlling factors and reactions to them.—L. R. Waldron.

1325. FIRBAS, HEINRICH. Über künstliche Keimung des Roggen- und Weizenpollens und seine Haltbarkeit. [Artificial germination of rye and wheat pollen and their longevity.] Zeitschr. Pflanzenzücht. 8: 70-73. 1921.—The author reviews previous findings in regard to the longevity of wheat and rye pollen, and discusses briefly the conditions affecting germination in artificial media and on stigmatic surfaces. It is concluded that temperature, air humidity, and age affect the viability of pollen.—F. P. Bussell.

1326. FISCHEL, ALFRED. Ursachen tierischer Farbleidung. [Causes of animal coat color.] Arch. Entwicklungsmech. Org. 46: 202-209. 1920.—A criticism is presented of a

paper of the same title by H. PRZIBRAM (Arch. Entwicklungsmech. Org. 45: 199-259. 1919). The latter, according to Fischel, attempts to interpret animal coat colors in too simple a way as the product of certain chemical and physical factors, due regard not being given to the morphological evidence on the part played by specialized pigment cells.—*Sewall Wright*.

1327. FRANZ, V. [German rev. of: (1) GOTTSCHICK, F. Die Umbildung der Süßwasser-schnecken des Tertiärbeckens von Steinheim a. A. unter dem Einfluss heisser Quellen. (The modification of fresh water snails of the Tertiary basin of Steinheim under the influence of hot springs.) Jenaische Zeitschr. Naturwiss. 56: 155-216. 3 pl. 1920. (2) PLATE, L. Bemerkungen über die deszendenztheoretische Bewertung der Umwandlungen von *Planorbis multiformis*. (Comments on the evolutionary significance of the polymorphism of *Planorbis multiformis*.) Jenaische Zeitschr. Naturwiss. 56: 217-224. 1920.] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 182-184. 1921.

1328. FRATEUR, J. L. La robe sauvage du lapin. [The wild coat of the rabbit.] Réunion Soc. Belge Biol. 1919: 941-943. 1919.—The author finds that crosses between rabbits with the agouti pattern of the wild species, and the black-and-tan variety give agoutis in F_1 and a 3:1 ratio in F_2 . The black-and-tan variety is dominant over non-agouti and gives a 3:1 ratio in F_2 . He concludes that the so-called agouti factor is complex. In either agoutis or black-and-tans, the white belly may or may not have a dark undercolor. Dark undercolor is dominant over pure white.—*Sewall Wright*.

1329. FRUWIRTH, C. Zu obigem Originalartikel. [Relative to the foregoing article.] Zeitschr. Pflanzenzücht. 8: 77-79. 1921.—[Comment on RAUM. Weissblühender Rotklee eine "umschlagende Sippe?" (White-flowering red clover an "ever-sporting variety?") (See Bot. Absts. 9, Entry 1368).] The author presents data given him in a letter by RIMPAU, and also data of his own, relative to inheritance of white in flower color in families of red clover. The data are inconclusive because a pure-breeding white-flowered strain of red clover was not certainly secured after several generations, although for a number of generations fertilization was done by bumblebees enclosed with isolated plants.—*L. R. Waldron*.

1330. GABRIEL, CYPRIEN. Sur un cas curieux d'adaptation florale. [A curious case of floral adaptation.] Compt. Rend. Soc. Biol. 83: 1441-1442. 1920.—Attention is directed to a previously overlooked dimorphism of the flowers of *Anchusa officinalis*. Type A has clear blue corolla 1.3 mm. long by 1 mm. in diameter, relatively infertile anthers, and is visited by bees and flies. Type B has violet corolla, is 2 mm. deep by 1 mm. in diameter, has long well-developed stamens, and is visited by *Scolia hortorum*. Both types produce nectar but the *Scolia* can not reach it in type A. The latter type sets abundant seed while type B is probably entirely infertile, serving merely as the source of pollen for A.—*Leonas L. Burlingame*.

1331. GALLAUD, M. Une lignée de Giroflées à anomalies multiples et héréditaires. [A line of wall flowers with multiple hereditary anomalies.] Compt. Rend. Acad. Sci. Paris 171: 47-49. 1920.—The author points out that unique examples of monstrosities in these plants have frequently been noted, but that there has been little precise knowledge of the relation of these forms to their parents or progeny.—He has studied 3 successive generations and furthermore has obtained as part of a single plant a large number of anomalies, some of which are already known and others are believed to be new. These are listed as follows: 1. *Pluricotyl embryos*. All seeds have shown this variation in percentages of from 7 to 100. The embryos have 1, 3, 4, or 5 distinct cotyledons, several of which have doubled lobes.—2. *Vegetative anomalies*. These include leaves with many points but with acuminate lateral expansions; also many which are undulated and strongly honeycombed. Some stalks manifest a tendency to fasciation with enlarged flattened branches and notable increase in density of leaves.—3. *Double flowers; proliferous shaded petals*. Next to the calyx is found a whorl of petals. The axis of the flower is elongated and bears a wreath of 10 or 11 petaloid pieces in 2 whorled series, following a novel lengthening of the axis and novel petaloid wreath. This phenomenon is repeated 6 times. All flowers of the stalks are double and sterile. The

percentage of double stalks ranges from 10 to 100.—4. *Double flowers by proliferation of the pistil*. In this type sepals, pistils, and stamens are formed normally but the pistil arises in a new flower, fitting in the first. The pistil of the 2nd type arises in turn in flower of third kind, etc. All flowers of the abnormal stalks are double.—5. *Plurivalved fruits*. Certain stalks have fruits usually pluricarpellate, giving 3, 4, or 5 petals with stigma having 3, 4, or 5 lobes. Some variations are present and not all fruits are aberrant; some fertile seeds are formed in both normal and pluricarpellate fruits.—6. *Intercarpellary flowers*. The anomaly is manifested in the first flowers by the presence of 3-4 carpels in the pistil, supplied with 3 to 4 stigmatic lobes. Seeds formed from these are capable of germination. The oldest flowers at the middle of the inflorescence have pistils alike but ovary forms a veritable intercarpellary flower. It is attached rather high on the placenta, which bears above and beneath it the atrophied but easily recognizable ovules. The intercarpellary flower thus gives proof of abnormal development in the ovule. The very small flower is complete with well formed sepals, petals, and stamens. The arrangement of parts, except as to number of members, is normal. Stamens are frequently devoid of pollen. The small pistil has always more than 2 carpels. One of the ovules instead of being rounded shows 3-4 lateral nipples. The anomaly persists even to the last flowers of the inflorescence.—These multiple anomalies and others not here noted are manifest in various directions in the organs, appearing more or less developed in each generation and show that there is a genuine and very intensive defect in this line of wall flowers. The author proposes to seek the cause of these hereditary variations and to determine the extent to which they can be fixed.—C. E. Myers.

1332. GARDNER, V. R. Bud selection, with special reference to the apple and strawberry. Missouri Agric. Exp. Sta. Res. Bull. 39. 30 p. 1920.—Apple trees grown as bud selections from high-yielding parents averaged about the same in yield as those from low-yielding parents. Selections from strawberries of high and low yield did not produce in general new strains of high- or low-yielding ability. The author notes a "running out" or "degeneration" in some bud selections. This is of 3 types: (a) Loss of ability to produce fruit; (b) loss of ability to produce runners; (c) reduction in general vegetative vigor. It is suggested that bud selection may be used as a means of keeping plants up to standard. There is also noted a case (which the author considers as reversed dominance) in which parental characters are changed in the offspring.—F. R. Clark.

1333. GEBHARDT, CURT. Die Grossknolligkeit der Kartoffelzüchtungen. [Largeness of tubers in potato breeding.] Zeitschr. Pflanzenzücht. 8: 85-88. 1921.—In a study of potato varieties, the writer found the number of large and small tubers produced by healthy and uninjured plants to be a varietal characteristic. Data are given in tabular form on the performance of 8 varieties.—Richard Wellington.

1334. GOLDSCHMIDT, RICHARD. Kleine Beobachtungen und Ideen zur Zellenlehre. III. Die Bedeutung der atypischen Spermatozoen. [Minor observations and ideas on cytology. III. The significance of atypic spermatozoa.] Arch. Zellforsch. 15: 291-300. 1920.—Previous observations had not shown that atypic spermatozoa function in fertilization, nor that they related to sex determinations, nor that they have any other function. The author describes experiments indicating that atypic spermatozoa are functionless, as follows: Male gipsy moths with low degree of intersexuality produce chiefly normal spermatozoa, while those with a high degree of intersexuality produce mostly atypic spermatozoa. Females mated with these intersexual males laid eggs; when high-grade intersexual male was used no larvae resulted (indicating that eggs were not fertilized), when medium intersexual male was used a few larvae developed, and when low-grade intersex was used larvae developed in normal numbers.—The production of atypic spermatozoa accompanies degenerative changes of other kinds, occurs to a high degree in transplanted testes, and is referred by the author to physico-chemical causes.—A. Franklin Shull.

1335. HAMMARLUND, C. Über die Vererbung anormaler Ähren bei *Plantago major*. [Inheritance of abnormal spikes in *Plantago major*.] Hereditas 2: 113-142. 7 fig. 1921.—Four

forms of plantain are concerned: (1) The normal form with long simple spikes and small bracts; (2) a form with branched spikes; (3) a form with bracts replaced by leaves, the spike being thus pyramidal; and (4) a form with bracts replaced by leaves and spike shortened to a rosette. All these were self-fertile.—Branched by normal gave normals in F_1 . In F_2 the ratios varied in different families, but selfed branched plants gave progenies with varying percentages of apparent normals. In the 2nd year, however, these same F_2 plants showed approximately 3 normals to 1 branched. This ratio was confirmed by a full F_3 .—Pyramidal by normal gave normals in F_1 . In F_2 the proportion was 12 normals to 3 rosetted to 1 pyramidal. Many seedling rosette plants perish prematurely unless special precautions are taken; and pyramidal are slightly less viable than normals. This proportion was confirmed by a full F_3 .—*John Belling*.

1336. HANCE, ROBERT T. [Rev. of: KUWADA, Y. *Die Chromosomenzahl von Zea Mays L. Ein Beitrag zur Hypothese der Individualität der Chromosomen und zur Frage über die Herkunft von Zea Mays L.* (The chromosome number of Zea Mays L. A contribution to the hypothesis of the individuality of chromosomes and to the problem of the origin of Zea Mays L.) Jour. Coll. Sci. Imp. Univ. Tôkyô 39: 1-148. 2 pl., 4 fig. 1919 (see Bot. Absts. 4, Entry 643).] Amer. Nat. 55: 268-275. 1921.

1337. HANSEN, W. *Die Ermittlung des Einzelkorngewichtes einer Pflanze.* [Determination of the weight of individual grains of a plant.] Zeitschr. Pflanzenzücht. 7: 225-227. 1920.—Determinations of the average weight of wheat grains based upon 2 samples of 50 each closely parallel the average weights of 1000 kernels and are considered a better measure for the purpose of selection than the average weight based upon all the seeds which the plant produces. Factors which increase the number of grains per plant tend to make the weights of individual seeds less. The taking of sub-samples by selecting the larger kernels is considered to give a truer indication of the size of seed. The same method applies with oats and only the upper seed in each spikelet need be considered.—*D. F. Jones*.

1338. HANSEN, W. *Die Mahndorfer Pflanzenzüchtung bzw. das Mahndorfer Usancenbuch.* [The Mahndorf plant breeding or the book of Mahndorf methods.] Zeitschr. Pflanzenzücht. 7: 283-318. 5 fig. 1920.—The author describes the development and application of the plant breeding methods in use at Mahndorf, dedicated to Mr. HACKE at the celebration of his 25 years of service as administrator. Following the results of BESELER and RIMPAU in Germany and the Svalöf Station in Sweden, the individual-plant-selection method was started in 1902 with peas and wheat. Attention has been chiefly confined to single varieties of the principal crops,—rye, winter wheat, summer wheat, barley, oats, and peas,—and in addition some work has been done with alfalfa, turnips, maize, poppy, rape, carrots, and grass. The principal qualities of the improved strains of these plants are stated, together with detailed descriptions of the methods of planting, arranging the plants in the field, harvesting, and recording results.—*D. F. Jones*.

1339. HARRIS, J. ARTHUR, AND F. G. BENEDICT. *The variation and the statistical constants of basal metabolism in men.* Jour. Biol. Chem. 46: 257-279. 1 fig. 1921.—This paper presents: (1) A measure of the variability of the basal metabolism of the normal individual; (2) a consideration of the relation between the length of time over which the observations extend and the variation in the metabolism of the individual; and (3) a consideration of the most suitable method for determining the population mean from measurements on a series of individuals. The results show significant ranges and standard deviations of metabolism (C. V. about 4 per cent). The variability in metabolism of the individual is positively correlated with duration of the period of time over which the observations have been distributed. The population constant derived from individual means is less modified by weighing than that deduced from individual minima. Weighing by method of means and on the basis of the square root of the number of days covered by observations is suggested.—*John W. Gowen*.

1340. HARRISON, J. W. HESLOP. The inheritance of size in the crosses involving *Oporabia autumnata* and *O. filigrammaria*. *Vasculum* 7: 49-56. 1921.—Mean wing length of the ♂ in the geometrid subspecies *O. autumnata* is 18 mm., in *O. filigrammaria* 16 mm. (81 and 91 individuals respectively). Arranged in groups based on 0.5 mm. differences, the larger species has its mode in "Class 10"; the smaller in "Class 6." Both F_1 and F_2 hybrids are intermediate, with modes in "Class 7" (means, 16 mm. and 16.85 mm.). F_1 parents of mean size gave F_2 showing no increased, but rather lessened, variability, that is, with 4.9 as the coefficient of variation as compared with 5.1. F_2 from unselected and mixed F_2 parents tends to resemble F_2 in size with slightly increased variability (especially true of ♀♀), both in certain individuals showing intermediate coloration and in others constituting a peculiar group of segregates as to color. Back-crosses similarly lend no support to the multiple-factor hypothesis, fluctuating about means intermediate between those of the 2 pure types (that is, 16.5 mm.—17.5 mm. in back-crosses, as compared with 16 mm.—18.1 mm. in pure types) and within narrow ranges. A comparative study of the ♂♂ of the various families under consideration corroborated the conclusions drawn from the examination of the ♂♂.—The results are "opposed to the multiple-factor theory of size determination unless it be granted that such factors do not segregate pure in gametogenesis but rather enter the F_1 gametes in an average or contaminated condition."—J. H. Gerould.

1341. HARTWELL, BURT L. Thirty-first annual report of the Director of the Rhode Island Agricultural Experiment Station. *Bull. Rhode Island State Coll.* 14: 57-65. 1919.—"The inheritable character to lay large eggs is not joined with high annual production; but a high percentage increase in egg-weight, usually during April and September, does appear to be associated with high annual production in numbers, at least for the first year."—Reciprocal crosses between heavy Cornish fowl and light-weight Hamburgs are reported as having been made in 1918 but results are not given.—William A. Lippincott.

1342. KELLEY, F. J. Substitutes for the words homozygous and heterozygous. *Science* 50: 458-460. 1919.—The common non-technical substitutes, pure, pure-bred, impure, mixed, hybrid, mongrel, cross-bred, are descriptive of origin. MENDEL himself used "constant" in the sense of homozygous. This term is not subject to the above objection, and inconstant may suitably be used for heterozygous.—John Belling.

1343. KNIBBS, G. H. The theory of large population-aggregates. *Metron* 1: 113-125. 1920.—The tendency of population to increase in geometrical progression may be modified by other factors coming into operation. The rate of increase is affected by the natural resources of the country, by technical skill, and by the standard of living. The possible density of population is limited. The curve $T = k t^{m-n}$ is suggested to describe the increase and ultimate decrease of population. Pressure of population produces war.—John Rice Miner.

1344. KNIGHT, L. I. Physiological aspects of self-sterility of the apple. *Proc. Amer. Soc. Hort. Sci.* 14: 101-105. 1917 [1918].—In self-pollinated Rome Beauty apples the pollen germinates properly, so that self-sterility is not due to pollen sterility. Asparagin present on the style does not retard growth; it has an accelerating effect in artificial cultures of pollen. The maximum growth of Rome Beauty pollen tubes in artificial cultures exceeded the length required to reach from the stigma to the egg when Rome Beauty flowers are self-pollinated. The maximum length of 10 mm. was attained by about 5 per cent of the tubes in 2 days, the required length for Rome Beauty styles being 7 mm. Pollen is not sensitive to excess moisture since Rome Beauty pollen germinates well in distilled water. No mechanical obstruction to the growth of pollen tubes was found. When Rome Beauty was pollinated with Jonathan, the pollen tubes traversed the length of the style in 48 hours whereas tubes from Beauty pollen were still growing in the style at the end of 120 hours when kept at a moderate temperature; at higher temperatures, 80-90° F., 24 hours only were required to traverse the style in selfed Rome Beauty. At the end of 120 hours the egg cell begins to disintegrate, inhibiting fertilization. The relatively slow rate of growth of Rome Beauty pollen tubes in Rome Beauty stylar tissue is suggested as an important factor in the self-sterility of that

variety, egg disintegration beginning before fertilization can take place. More rapid tube growth at higher temperature may explain self-fertility under certain climatic conditions in varieties which are usually self-sterile.—*J. P. Shelton*.

1345. LATHOUWERS, V. Variations speltoides dans des lignées pures de Froment et dans une population d'Epeautre. [Speltoid variations in pure lines of wheat and in a population of einkorn.] Bull. Soc. Roy. Bot. Belgique 54:218-223. 1921.—In 1919 in 2 pure lines belonging to different varieties of wheat, under observation since 1913, 2 aberrant plants were found, having the same aspect as those described by NILSSON-EHLE of Svalöf under the name "speltoid mutations." The author studied the 2nd generation of these, besides an aberrant plant in a "population" of einkorn. His observations did not permit him to draw any definitive conclusion. He hopes that the 3rd generation will demonstrate whether mutation or spontaneous hybridization has occurred.—*Henri Micheels*.

1346. LILLIE, FRANK R. Studies of fertilization. IX. On the question of superposition of fertilization on parthenogenesis in *Strongylocentrotus purpuratus*. Biol. Bull. 40: 23-31. 1921.—In a series of carefully controlled experiments, the author shows that eggs of *Strongylocentrotus purpuratus*, which have formed membranes as a result of treatment with butyric acid, are usually incapable of fertilization with sperm even though the membranes are destroyed by shaking immediately after they have been formed; exceptions (1-5 per cent) are explained by the assumption that the reaction after treatment with butyric acid is incomplete. The membrane reaction following butyric acid is the same as that following insemination; this is shown by similarity of the membranes formed in the 2 cases, and by the fact that the rate of formation is the same.—*Bertram G. Smith*.

1347. LINDSTROM, E. W. Concerning the inheritance of green and yellow pigments in maize seedlings. Genetics 6: 91-110. 1921.—The author analyzes the inheritance of 3 colors in the seedling leaves of maize. These colors are known as white, virescent, and yellow, and the factor pairs are designated *Ww*, *Vv*, and *Ll*. These 3 leaf-color factors are found to be independent in inheritance and in addition the *Ll* factor pair for yellow leaves is found to be closely linked with the *Rr* factor pair for the aleurone color of the seeds. There is but 1.6 per cent of crossing over between the *Ll* and *Rr* factors.—*J. H. Kempton*.

1348. LOTSY, J. P. *Oenothera*-proeven in 1919. [*Oenothera* experiments in 1919.] Genetica 2: 385-399. 1 pl., 3 fig. 1920.

1349. LOVE, JAMES KERR. The origin of sporadic congenital deafness. Jour. Laryngol. Rhinol. and Otol. 35:263-270. 1920.—The paper undertakes to show that "sporadic congenital deafness is hereditary and that such heredity is Mendelian." The subject is discussed theoretically, and cases are cited to show that the deafness behaves as a Mendelian recessive. A chart of "The Ayrshire Family" gives a concrete illustration and shows 5 affected generations descended from a common ancestor 3 generations further back. The family is Scotch but has branches in America and Australia.—*Howard J. Banker*.

1350. MACDONALD, ARTHUR. Scots and Scottish influence in Congress. Metron 1: 140-155. 1920.—A brief description is presented of the racial constitution of the Scotch and their characteristics emphasizing especially their "independence, persistence, and zeal for education," fearlessness, and family feeling. These qualities are illustrated by the performances of Scotch immigrants to the U. S. A. and the many Scotch political leaders in American history. Then follows a statistical analysis of the Senate of the 62nd Congress of the U. S. A. and its legislative work showing the leadership of the Scotch constituency. The paper closes with a comment on the decreasing number of great statesmen, attributing this to the increase in complexity of the environment through social inheritance "while our inherited natures remain unchanged;" "social heredity has outrun germinal heredity."—*Howard J. Banker*.

1351. MARCHAL, E. Recherches sur les variations numériques des chromosomes dans la série végétale. [Studies on the numerical variations of the chromosomes in plants.] Mem.

Acad. Roy. Belgique Cl. Sci. Ser. II. 4: 1-108. 4 pl., 24 fig. 1920.—This work, describing the results of the author's cytological studies on *Campanula* and the Compositae *Liguliflores*, is largely a critical review of the chromosome number reported for the various groups of the plant kingdom. He concludes that there is no absolute relation between chromosome number and plant complexity (taxonomic position), but that there appears to be a suggestive relation between the chromosome number of plants nearly related, that is, plants within a taxonomic group may possess chromosome numbers that may be arranged in geometrical or arithmetical progression, indicating, possibly, a common ancestry which has given rise to the new forms through chromosomal mutations of one kind or another. The usual methods by which the chromosome number may be permanently modified are discussed. The volume and the dimensions of chromosomes are very briefly considered. That markedly different plant forms may possess chromosome complexes alike as far as number is concerned is intelligible to the author in the light of the different physiological effects produced by bacteria morphologically similar.—*Robert T. Hance.*

1352. MINOURA, TADACHIKA. A study of testis and ovary grafts on the hen's egg and their effects on the embryo. Jour. Exp. Zool. 33: 1-61. 10 pl. 1921.—Following the grafting of pieces of ovary (or testes) upon the embryonic membranes of developing chickens, deviations from the normal in the reproductive systems of the hosts were observed in some instances, pointing toward the production of hormones by the engrafted gonad capable of modifying the development of the primary sex organs along the lines suggested by LILLIE in accounting for the free-martins.—*H. D. Goodale.*

1353. MIYAZAWA, B. Studies of inheritance in the Japanese *Convolvulus*. Part II. Jour. Genetics 11: 1-15. 1 colored pl. 1921.—The previous article states that yellow-leaved plants never bear dark red flowers, but recently the author has obtained a yellow-leaved race with dark red flowers. Various crosses are described with data, and the streaking on solid colored flowers and the correlations of leaf and flower colors are noted. The observations are interpreted on a factorial basis. G = gene for green color in leaf; D = dark red flower color when the accompanying G is homozygous; B = blue color; M = modifier of tone of flower color both in homozygous and heterozygous condition. Summary: (1) Light magenta color in F_1 is produced when both G and D are in heterozygous condition and bluing gene B and modifying gene M are brought in from parent A. (2) Reciprocal hybrids are similar to each other in all respects. (3) D produces dark red colors when G is present in homozygous condition but dark red (magenta and scarlet) when G is heterozygous or absent. Such an interrelation between G and D is found only in hybrids between plants A and B and does not exist in other hybrids though C has colors closely related to those of B. (4) The fact that D has such a character is seen from results in which all 3 families of offspring of a hybrid which is green, white and yellow, and deep scarlet, respectively, produced dark red colors. (5) The effects of B are not manifested in individuals which are in the homozygous condition with respect to G . (6) Magenta color appears in plants which have the constitution DB , either Gg or gg being present at the same time. On the contrary, scarlet appears only in plants which are in condition Db . (7) White appears in individuals when D is absent and then G , B , and M may be in any condition. (8) Interrelations between D and M are as follows: DdM = light color; DD = medium color; $DDmm$ and $Ddmm$ = deep color. (9) Magenta color is dominant over scarlet and dark red, and scarlet dominant over dark red. (10) There may exist homozygous plants with respect to flower color with medium and deep tones of magenta, scarlet, and dark red, but the authors have found no individuals with light tones of these colors.—*E. E. Barker.*

1354. MOHR, OTTO L. A case of hereditary brachyphalangy utilized as evidence in forensic medicine. Hereditas 2: 290-298. 10 fig. 1921.—The publication deals with a paternity case in which the author had to give an opinion as medical expert. The man upon whom an illegitimate child had been fathered denied the parentage. It was found that he suffered from a pronounced case of a dominant hereditary brachyphalangy affecting the 2nd row of phalanges on the II-IV fingers and toes; thumbs were normal but the basal phalanx of big toes was shortened. The child's hands and feet exhibited an exactly similar malformation. Com-

parison of the radiographs revealed an absolute correspondence, even in details between the man's and the child's type of brachyphalangy. The possibility of the mother being acquainted with other brachyphalangious men could be excluded, and the conclusion given in the case was positive. The man, according to the judgment passed, was found to be the father of the child mentioned.—*Otto L. Mohr*.

1355. MOHR, OTTO L. En arvelig misdannelse som bevismiddel i en farsskapsak. [A hereditary malformation as evidence in a paternity case.] *Tidsskr. Norske Laegefor.* 40: 521-529. 6 fig. 1920.—A short account is presented of the case mentioned in the preceding abstract.—*Otto L. Mohr*.

1356. MOORE, CARL R. On the physiological properties of the gonads as controllers of somatic and psychical characteristics. III. Artificial hermaphroditism in rats. *Jour. Exp. Zool.* 33: 129-171. 15 fig. 1921.—Grafts of an ovary (or testis) into a hemicastrated animal of the opposite sex were successfully made (persisting at least 8½ months) without evidence of deleterious influence on the host's somatic or psychical characteristics, nor was there evidence of an antagonism between the 2 unlike gonads.—*H. D. Goodale*.

1357. MORISHIMA, KAN-ICHIRO. Variations in typhoid bacilli. *Jour. Bacteriol.* 6: 275-323. 1921.—Alterations induced in the fermentation of arabinose, dulcitol, glycerol, inositol, raffinose, rhamnose, salicin, and xylose, as well as alterations occurring in artificial environment in reference to the production of acid and alkali, in agglutination, and the formation of "daughter colonies," should be regarded as variants and not as deVriesian "mutations."—*Andrew I. Dawson*.

1358. NACHTSHEIM, HANS. Die Bestimmung des Geschlechtes bei *Dinophilus*. [The determination of sex in *Dinophilus*.] *Sitzungsber. Ges. Morphol. Physiol. München* 1919: 46-53. 1920.

1359. NACHTSHEIM. [German rev. of: MORGAN, THOMAS HUNT. The physical basis of heredity. 14 × 21 cm., 300 p., 117 fig. J. B. Lippincott Co.: Philadelphia, 1919 (see Bot. Absts. 5, Entry 422; 7, Entry 938).] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 26: 176-178. 1921.

1360. NILSSON-EHLE. [German rev. of: FRUWIRTH, C., TH. ROEMER, UND E. VON TSCHERMAK. Handbuch der landwirtschaftlichen Pflanzenzüchtung. 4. Die Züchtung der vier Hauptgetreidearten und der Zuckerrübe. (Handbook of agricultural plant breeding. 4. Breeding of the four chief cereals and the sugar beet.) 3rd ed., 8 vo., xv + 504 p., 42 fig. Paul Parey: Berlin, 1918 (see Bot. Absts. 6, Entry 1081).] *Zeitschr. Indukt. Abstamm.- u. Vererb.* 26: 175-176. 1921.

1361. [PALMER, E. F.] Report of the Ontario Horticultural Experiment Station, Vineland Station, Ontario. 1918: 1-40. 1919.—The "Plant Breeding Report" occurs on pages 9-21, and is devoted mainly to the progress of fruit and vegetable breeding projects. A few Early Crawford peach seedlings which had fruited were apparently worthless, while a Leamington self-fertilized seedling showed much promise. Seedlings of *Rubus occidentalis* and Gregg (black raspberry) came so true to type that it is deemed feasible to propagate black-caps by seed. Slight variations were noted in the degree of thorniness, habit of fruiting, and size and quality of the fruit in 410 seedlings of *Rubus strigosus* (wild red raspberry). All seedlings, 140 in number, of *Rubus occidentalis* (wild black) × *Rubus strigosus* (wild red) possessed characters of both species and bore purple fruits; while 230 plants of the reciprocal cross possessed wild red raspberry foliage and thornier canes than the red raspberry and bore red fruits that were drier and firmer than the wild red. Seedlings, 152 in number, of Gregg × Cuthbert (red raspberry) gave 117 intermediate purple-fruited types, 28 black caps, and 7 red raspberries, or an approximate ratio of 1 red to 4 blacks to 16 purples. The purples varied in thorniness from very thorny to almost smooth, while the black caps resembled the Gregg and the red the Cuthbert as regards thorniness. The reciprocal cross, Cuthbert × Gregg,

gave all red raspberries. Crosses were also made between Cuthbert and blackberry, loganberry and raspberry, currant and gooseberry, and European and American gooseberry. The report closes with a statement of the objects sought in breeding corn, cucumbers, egg plant, peppers, garden peas, potatoes, and tomatoes.—*R. Wellington.*

1362. PEASE, M. S. [German rev. of: STAKMAN, E. C., J. H. PARKER, AND F. J. PIEMEISEL. Can biologic forms of stem rust on wheat change rapidly enough to interfere with breeding for rust resistance? Jour. Agric. Res. 14: 111-124. 5 pl. 1918 (see Bot. Absts. 1, Entry 500; 2, Entry 397).] Zeitschr. Indukt. Abstamm.- u. Vererb. 26: 179-180. 1921.

1363. PÉZARD, A. Numerical law of regression of certain secondary sex characters. Jour. Gen. Physiol. 3: 271-283. 8 fig. 1921.—The rate at which the comb of a castrated cock shrinks is expressed by a parabola having the formula $L = l + \frac{1}{2} C (\vartheta - t)^2$, where L is final length of comb, C a constant for each individual, ϑ duration of shrinkage, l length of comb at some particular time, t . It was also noted that $C \vartheta$ is nearly constant.—*H. D. Goodale.*

1364. PICKETT, B. S. Correlations between fruit and foliage in strawberries. Proc. Amer. Soc. Hort. Sci. 14: 56-59. 1917 [1918].—A summary of the relationship between (1) the average weight of berries and average area of leaflets, (2) the total production of fruit and total area of the foliage, (3) the number of leaves and the number of berries, is presented for 900 seedlings, the progeny of crosses of 17 varieties of strawberries. The correlation between (1) number of leaves and berries was $.4792 \pm 0.0022$, (2) average area of the leaflets and average weight of fruit 0.28904 ± 0.00456 , and (3) total area of foliage and total weight of fruit 0.7503 ± 0.0012 . It was concluded that it was not practical to use these correlations as a basis of eliminating strawberry seedlings.—*W. D. Valleau.*

1365. PUNNETT, R. C., AND P. G. BAILEY. Genetic studies in poultry. III. Hen-feathered cocks. Jour. Genetics 11: 37-57. Pl. 7-11, 2 fig. 1921.—The authors accept for the present MORGAN's theory that hen-feathering in the cock is due to the presence of luteal cells. They regard hen-feathering in cocks to be the result of a single factor, which, however, is distinct from the one that produces the normal hen plumage. The former is transmitted equally to both sexes, the latter only to females. The factor producing hen-feathering in males is dominant, but intermediate forms occur among heterozygotes. These, in their 1st year's plumage, may resemble very closely normal males, but in the succeeding moult take on almost entirely the plumage of the hen-feathered males.—*H. G. May.*

1366. RASMUSON, HANS. Beiträge zu einer genetischen Analyse zweier *Godetia*-Arten und ihre Bastarde. [Contribution to a genetical analysis of two *Godetia* species and their hybrids.] Hereditas 2: 143-289. 1 pl., 29 fig. 1921.—Results are described of varietal and specific crosses in *Godetia Whitneyi* and *G. amoena*. The work was begun in 1917 with commercial seed. The procedure involved crosses between types of unknown genotype. Parental plants were selfed in each case. In the event of segregation of selfed plants their progeny was further tested during the next 2 seasons. The progeny of crosses was also carried through to F_2 and in some cases to F_3 . The number of differential characters is considerable and some of the phenotypes are highly modifiable, making their separation uncertain. The populations were in general small. The interspecific hybrids were almost completely sterile, though enough F_2 plants were secured in some cases to show that the genes behave in the same manner as in varietal crosses. For these reasons the author's conclusions are put forward in some cases with caution. The characters studied were color, size, and doubleness of corolla, color and shape of leaves, and habit of growth of plant. Heritable differences were demonstrated for all these characters and a factorial analysis proposed for the following: (1) *G. Whitneyi*. (a) *aa* plants have yellow-margined petals; (b) *B* plants in the absence of other dominant color genes have pale violet-colored petals; (c) *C* in place of *B* gives rose varying to nearly white; (d) *D* alone has no effect, but with *B* or *C* produces lilac; (e) *E* produces red petals; (f) *F* with *E* gives red with light-margined petals but alone has no effect; (g) *G* produces a red spot in the middle of the petal; (h) *H* enlarges the set but alone is without effect; (i) *I* gives,

probably with *B* only, rose-lilac. (2) In *G. Whitneyi* it was shown that *aa* plants have smaller corollas, though it is probable that other genes are also concerned in corolla length. (3) Segregation was shown in this species, but the factors were not definitely determined for light and dark green leaves, long narrow *versus* short broad leaves, and low dense growth habit *versus* taller lax type. The latter is probably a simple genetic difference due to gene *R*. (4) Linkage relations suggest that the *B*, *E*, and *G* allelomorphic pairs are in the same chromosome pair. The crossover percentage for the *B* and *E* pair was figured at 14.3 per cent. *C* and *F* genes are thought also to be linked but in a 2nd chromosome pair. (5) In *G. amoena* a pure variety was found with a large spot on the petals not reaching to the base ("Querfleck"), and another with a small basal spot. Types with both spots when selfed gave 1 "querfleck": 2 double-spot: 1 basal spot. Both types of spots give 3:1 ratio with unspotted *Whitneyi* varieties. The author suggests either multiple allelomorphism or close linkage, preferring for the present the latter. (6) Double is dominant to single (gene *U*) but is influenced in *G. amoena* by factor *L* or *K* concerned with spotting. Basal-spot flowers (*Lg Lg*) are more double than double-spotted ones (*Lg lG*) and these more double than "querfleck" (*lG lG*). (7) No *Oenothera*-like phenomena were found and interspecific crosses behaved like varietal ones in respect to flower color, doubleness of flower, and growth form of plant, at least in so far as the small progenies permit a decision.—*Leonas L. Burlingame*.

1367. RASMUSON, HANS. On some hybridization experiments with varieties of *Collinsia* species. *Hereditas* 1: 178-185. 1 fig. 1920.—A white-flowered variety of *Collinsia bicolor* was crossed with the normal type having lilac on the under lip and being whitish on the upper. *F*₁ plants were lilac, and in *F*₂ segregation of 9 lilac to 7 white was observed. Green stem was recessive to red, and the *F*₂ ratio was approximately 9 red: 3 slightly tinged with red: 4 green. An *A* factor is assumed which produces white flowers and red-tinged stem, and a *B* factor which causes white flowers and green stem. *AB* gives lilac flowers and red stem, and *ab* gives white flowers and green stem. A variegated plant of *C. tinctoria* crossed with the self-colored type gave 3 self to 1 variegated in *F*₂. One-fourth of the variegated plants were yellow and non-viable. A gene, *I*, is postulated which increases the amount of green in variegated plants. The yellow plants are assumed to be *ii*. Spots on the upper lip of the flower of *C. tinctoria* proved to be a simple Mendelian dominant condition.—*A. C. Fraser*.

1368. RAUM. Weissblühender Rotklee eine "umschlagende Sippe?" [White-flowering red clover, an "ever-sporting variety?"] *Zeitschr. Pflanzenzücht.* 8: 73-77. 1921.—Seeds of open-pollinated white-flowering heads of red clover produced 0.8 per cent white-flowering plants, presumed to have arisen through geitonogamy, produced seed unguarded but geographically isolated. Of 200 offspring only 11, or 5 per cent, came white. Seed from 48 red-flowered plants descended from white-flowered plants produced white-flowered plants in only 19 of the 48 families to the extent of 41 white to 231 red. Some intermediacy was evidenced by flower color. The author believes that the data warrant the conclusion that white-flowering red clover is an ever-sporting form comparable in some ways to four- and five-leaved ever-sporting strains of red clover. The problem is considered of economic importance. [See also Bot. Absts. 9, Entry 1329.]—*L. R. Waldron*.

1369. REGAN, W. M. Breeding experiments with dairy cattle. New Jersey Dept. Agric. Bull. 24. 323-326. 1920.—The author describes breeding experiments now in progress, the object of which is to determine the value of inbreeding, line-breeding, and out-breeding in improving dairy cattle. It is also planned to attack the questions of "nicking" and inheritance of milk secretion.—*E. Roberts*.

1370. RHODES, ROBERT CLINTON. Binary fission in *Collodictyon triciliatum* Carter. Univ. California Publ. Zool. 19: 201-274. Pl. 7-14, 4 fig. 1919.—The author presents a detailed account of *Collodictyon triciliatum*, free-living flagellate reproducing solely by binary fission. An extended discussion is given of its affinities based on the form of mitosis, of which full descriptive account is given.—*R. E. Clausen*.

1371. ROBERTSON, ELIZABETH. Notes on breeding for increase of milk in dairy cattle. Jour. Genetics 11: 79-90. 1921.—A study was made of the methods of breeding Kerry cattle in relation to increase in milk and fat production. The conclusion was reached that milk and fat are increased by inbreeding to a male relationship and decreased by breeding to a female relationship. By male relationship the author means "the mating of a bull with a cow, which is so related to him that their first common ancestor is a bull." If the first common ancestor is a cow it is called a female relationship.—*E. Roberts.*

1372. SCHIEMANN, E. [German rev. of: (1) CORRENS, C. Die geschlechtliche Tendenz der Keimzellen gemischtgeschlechtiger Pflanzen. (Sex tendency of germ-cells in plants of mixed sex.) Zeitschr. Bot. 12: 49-60. 2 fig. 1920 (see Bot. Absts. 8, Entry 1066). (2) WETTSTEIN, F. VON. Künstliche haploide Parthenogenese bei Vaucheria und die geschlechtliche Tendenz ihrer Keimzellen. (Artificial haploid parthenogenesis in Vaucheria and the sexual tendency of the germ-cells.) Ber. Deutsch. Bot. Ges. 38: 260-266. 2 fig. 1920 (see Bot. Absts. 9, Entry 777).] Zeitschr. Indukt. Abstamm.- u. Vererb. 25: 255-256. 1921.

1373. SLOCUM, ROB. R. Standard varieties of chickens. II. The Mediterranean and continental classes. U. S. Dept. Agric. Farmers' Bull. 898. 27 p., 22 fig. 1920.—The author gives simple descriptions based on the American Standards of perfection, but does not go into as great detail. The bulletin is intended for the use of small poultrymen and farmers who keep some poultry. Under the Mediterranean classes are described the Leghorns, Minorcas, Anconas, Spanish, and Blue Andalusian; under the continental classes, the Campines.—*H. G. May.*

1374. SMALL, JAMES. The origin and development of the Compositae. Chap. XI. The origin of the Compositae. New Phytol. 18: 65-89. Fig. 41-55. 1919.—Theories of evolution are discussed under the following headings: Natural selection, mutations, orthogenesis, epharmosis, isolation, and differentiation. The author concludes that "In evolution by orthogenetic saltation, with epharmosis and elimination of the unfit,—we have the best of Darwinism, neo-Lamarckism, neo-vitalism, Mendelism, and the mutation theory." Orthogenetic saltation is looked upon as determining the inner constitution of a species, the expression of that constitution being modified by epharmosis. Mendelian segregation is stated as having most evidence to support it as an originating cause of a large number of taxonomic species or even genera. The Lobelioideae are considered to be the ancestral group from which Compositae have been derived. A picture is given of the transformation of a tropical, arborescent species of *Siphocampylus* to an Andean species with all the essential characters of a *Senecio*. [See also Bot. Absts. 3, Entry 1142.]—*T. H. Goodspeed.*

1375. STIEVE, H. Verjüngung durch experimentelle Neubelebung der alternden Pubertätsdrüse, von E. Steinach. [Rejuvenation through experimental revitalization of senile sex glands, of E. Steinach.] Naturwissenschaften 8: 643-645. 1920.—Stieve points out the need of caution in accepting STEINACH's results, calling attention to certain contradictory evidence.—*H. D. Goodale.*

1376. TSCHERMAK, ERICH VON. Beiträge zur Vervollkommnung der Technik der Bastardierungszüchtung der vier Hauptgetreidearten. [Contributions to the perfection of the technique of hybridization in the four chief species of cereals.] Zeitschr. Pflanzenzücht. 8: 1-13. 7 fig. 1921.—This paper describes the physical conditions of the spikelets of rye, wheat, barley, and oats at the season of flowering. The author gives in some detail the technique used in making cross-pollinations within each sort and the climatic conditions necessary to success.—*F. P. Bussell.*

1377. TUFTS, W. P. Selection of deciduous fruits. Univ. California Jour. Agric. 6: 14, 15, 28, 29, 30. 1920.—Practically all deciduous fruits are said to be benefited by cross-pollination. Apples, almonds, cherries, figs, filberts, nectarines, peaches, pears, and plums may be divided into self-sterile and self-fertile groups. Varieties of deciduous fruits best suited to California conditions are recommended.—*T. E. Gaty, Jr.*

1378. UBISCH, G. VON. Anwendung der Vererbungsgesetze auf die Kulturpflanzen. [Application of laws of heredity to cultivated plants.] *Naturwissenschaften* 8: 293-299. 1920.—The application of laws of heredity to improvement of cultivated plants is discussed. The author points out the intimate interrelations of theory and practice. The term Mendelian character is used in a special sense to refer to character differences between individuals and races. Difficulties are met with which are dependent upon the effect of environment on the development of characters, existence of complex factor relations in what appear to be simple character contrasts, and the occurrence of linkage phenomena. Linkage is especially important in practical work because it may greatly increase the difficulty of securing desired combinations of factors. Correlations are physiological and should not be confused with linkage phenomena, which depend upon the location of factors in the same chromosome.—Intelligent plant breeding must take account of biological relations in different plants, particularly features connected with blooming and setting of seed. When plants are propagated vegetatively seed constancy is not necessary, and a highly heterozygous condition may be desirable on account of its stimulating effect. Different treatments are accorded seed plants depending on whether they are self-fertilized, cross-fertilized, or self-sterile. Genetic analysis is most readily accomplished in a self-fertilized plant, and illustrative details are given for wheat, oats, and barley. Rye is mostly self-sterile, consequently breeding to an absolutely homozygous condition is impossible. In potatoes self-sterility, low fertility, and degeneration following self-fertilization are hindrances to success in breeding, but statements in the literature cannot be accepted without reservations. There is a possibility of attaining immunity to disease by crossing with wild species. Degeneration in potatoes should be a subject for future solution. In sugar beets genetic analysis is particularly difficult because of the influence of external conditions. The aim of sugar beet breeding is to combine high sugar content with high weight, a very difficult task because both characters are determined by a series of multiple factors. The sugar beet may be crossed with other beet derivatives.—The possibility of improvement depends upon genetic diversity of species; good characters of whole series of forms may then be gradually combined in one. The origin of germinal diversity is not well understood. The idea of gradual change under the effect of environmental conditions conflicts with present conceptions of the nature of the gene and of changes in it. Fortuitous mutation with subsequent selection of favorable mutations may account for progress, but even so-called mutations may often be cases of complex segregations. Reversion to wild type on crossing is an instance of complex factor interaction, of great theoretical interest because it permits of phylogenetic deductions. Advance in knowledge continually widens the circle of phenomena subjected to genetic experimentation.—*R. E. Clausen.*

1379. VINCENT, C. C. Results of pollination studies at Idaho University. *Better Fruit* 14³: 11-15. 3 fig. 1920.—One of the first problems in apple orchard pollination is the detection of varieties inclined to be unfruitful when planted alone. Self-sterility is not a constant character; hence fertility of commercial varieties must be tested locally. Of 50 varieties tested, 18 were found to be self-sterile, 7 self-fertile, and 25 partially self-fertile. In this fruit among varieties of apples, when blossoms are exposed to insect visitation, counts were made on certain branches at flowering time and final counts on June 15 of "fruits set." The percentages for the 4 varieties Wagener, Grimes, Rome, and Jonathan ranged from 46.7 to 76 with an average of 63.6; no counts were made at time of harvest. Had harvest counts been made the author estimates a 50 per cent reduction in percentages, bringing the normal set of fruit to approximately 31.8 per cent. If, under favorable conditions, 31.8 per cent constitutes a normal set of fruit when 2 or more varieties are planted together, the majority of varieties tested for self-fertility would not be productive if planted each by itself in large blocks. Two methods of determining self-sterility were tested: 1st, enclosing unopened blossoms in paper sacks, and 2nd, erecting tents of cheese-cloth over individual trees. The results showed very little difference between the 2 methods. Thermometer readings, within and without the cheese-cloth cages, showed that temperature differences under the 2 conditions were very slight. Seed production is less in self-fertilized fruits than in cross-pollinated fruits. A large number of domestic commercial varieties of apples are self-sterile, and those

that are apparently fertile, or partially so, produce fruits inferior in size to those set under natural conditions. Cross-pollination experiments are necessary to determine the best pollinizers for any commercial variety. A test of 9 varieties in 16 crosses shows a wide variation in results; the percentage ranging from 0 for Grimes \times Gravenstein and Wagener \times Gravenstein, to 35 for Spitzenburg \times Grimes, and 34.5 for Newtown \times Jonathan.—In selecting a pollinizer the following points require consideration: 1st, mutual affinity is necessary between varieties planted together; 2nd, the 2 varieties must bloom at approximately the same time; and, 3rd, the varieties should be good pollen-producers.—For existing orchards, grafting over (at least 1 tree in 10) of a variety deficient in pollen production with a variety producing abundant pollen, is suggested. One hive of bees to the acre, especially during the blooming period, would unquestionably increase the normal set of fruit. [See also Bot. Absts. 6, Entry 1164.]—*C. S. Crandall.*

1380. WATSON, J. A. S. A Mendelian experiment with Aberdeen-Angus and West Highland cattle. *Jour. Genetics* 11: 59–67. *Pl. 12.* 1921.—Coat, conformation, horns, and color were included in the investigation. No definite information was obtained concerning coat and conformation. Polled and horned characters form a simple Mendelian pair. In the female, the polled condition is completely dominant while in heterozygous males the development of horns is sometimes but not always completely suppressed.—Black and red are allelomorphic, black being dominant. The relation of dun to black and red is not clear. Different hypotheses are discussed.—*E. Roberts.*

1381. WHIPPLE, O. B. Methods in pure-line selection work with potatoes. *Proc. Amer. Soc. Hort. Sci.* 14: 34–38. 1917 [1918].—A general discussion is presented.—*J. P. Shelton.*

1382. WRIEDT, CHR. Albinisme i hester. Borket, hvitborket og gule. [Albinism in horses. Three types of dun involving the albino factor.] *Tidsskr. Norske Landbr.* 1918: 396–406. 1918.—Albino horses are not mentioned in the earlier publications on the inheritance of coat color in horses. In the 2 Norwegian breeds of horses, the Gudbrandsdalians and the Fjords, albino individuals sometimes occur. In the present publication it is demonstrated that several types of dun are the heterozygotes of the albino factor. Three such types of dun are recorded. In the 1st case the albino factor reduces the brown or bay color to a type of dun called "borket." In this type of dun the same black markings as those of brown and bay are found. The not-black color is a golden yellow, especially in the summer. The second type, in Norway termed "gul" (yellow), is the heterozygote of albino and chestnut. These individuals lack the black markings, but the skin is pigmented and the hairs are of the same golden yellow color as in the 1st type. In the 3rd type, termed "hvitborket," the albino factor is in combination with a dominant dilution factor which reduces brown and bay to a type of dun called "blak." "Blak" is the same type of color as the one found in the Prevalseky horse. "Hvitborket" hairs have the same black points as bay, but the rest of the hair has a very faded yellow, nearly white, color.—The data presented show a clear-cut segregation of albinos in both the "borket" and the "hvitborket" crosses. "Borket" \times "borket" gave 2 brown or bay, 7 "borket," and 2 albinos. Different authors are cited, their data all showing the same kind of segregation. "Hvitborket" \times "hvitborket" gave 6 "blak," 2 brown or bay, 18 "hvitborket," and 16 albinos. Brown or bay \times albino gave 10 "borket." "Blak" \times albino gave 8 "hvitborket." The back-cross "borket" \times brown or bay gave 119 "borket," 7 "gul" (yellow), 143 brown or bay, and 7 chestnut. The back-cross "hvitborket" \times "blak" gave 25 "hvitborket," 29 "blak," 1 "røblak" (chestnut reduced by the dilution factor), and 1 brown or bay. The data concerning "gul" are scarce. A single cross of albino \times chestnut gave "gul." "Borket" \times chestnut gave 7 "borket," 4 "gul," and 1 chestnut. "Gul" (yellow) \times brown or bay gave 6 "borket," 2 "gul," 9 brown or bay, and 1 chestnut. The mating albino \times albino has in Beberbeck given albinos without exception in 200 cases.—The albino color in horses behaves nearly in the same way as does albino in guinea-pigs. Individuals are found which have some pigment on ears, mane, and tail.—*Otto L. Mohr.*

1383. W[RIGHT], S[EWALL]. [Rev. of: CASTLE, W. E. *Genetics and eugenics*. 2nd ed., 15.5 \times 23.5 cm., 395 p., 7 pl., 155 fig. Harvard Univ. Press: Cambridge, Massachusetts, 1920 (see Bot. Absts. 7, Entry 1734).] *Jour. Heredity* 12: 71. 1921.

1384. WRIGHT, SEWALL. [Rev. of: CHILD, CHARLES MANNING. *The origin and development of the nervous system*. 296 p., 70 fig. Univ. of Chicago Press: Chicago, 1921.] *Jour. Heredity* 12: 72-75. 1921.—The author points out that Child's book has wider interest than might be inferred from the title, as it deals with some of the most fundamental problems of biology. He criticises the author for making no attempt to bring the facts of genetics into relation to his theory, and for apparently looking on the cell "as an organization in a particular kind of matter determined merely by a surface-interior gradient in relation to external conditions," overlooking the well-established facts of cytology and the genetical evidence for the individuality of the unit factors. The reviewer sees no incompatibility between "the genetical and cytological conception of the cell as an association of independent organisms, living in a relatively large, less specialized mass of protoplasm and controlling the behavior of the whole in response, of course, to external stimuli, . . . [and] a simple mechanism of heredity and a simple physiological conception of development such as that offered by Child."—*Geo. H. Shull*.

1385. YAMAGUCHI, Y. Kurtze Mitteilung über die Beziehung der Aufblühzeit und des Sitzes der Blüte am Rispenaste zum Korngewichte des Reises. [Concerning the time of blossoming and the flower position on the branch to the grain-weight of rice.] *Bot. Mag. Tōkyō* 34: 136-139. 1 fig. 1920.—The paper is preliminary to a fuller one to be published in Vol. 1, Heft 4, 1919, of *Berichte des Ohara Instituts für Landwirtschaftliche Forschungen* [see following entry].—*Leonas L. Burlingame*.

1386. YAMAGUCHI, Y. Über die Beziehung der Aufblühzeit und des Sitzes der Blüte am Rispenaste zum Korngewichte des Reises. [The relation between the time of flowering and the position on the panicle to the weight of the rice seed.] *Ber. Ohara Inst. Landw. Forsch.* 1: 451-517. 25 fig. 1919.—The flowers on the apical branch of the rice panicle are the first to open. The flowers on a single branch open in a definite but not serial order. The order in which they open on the individual branches was 1, (7), 6, 5, 4, 8, 3, 11, 2, 15, The branches of the panicle blossom in characteristic basipetal order. This characteristic regularity may be assumed to have a significant relationship to other characters, such as the weight of the seed.—The heaviest seed (both in the entire panicle and in the separate branch) usually develops from flowers opening on the 2nd, 3rd, or later day. The coefficient of correlation between time of flowering and weight of seed ranges from $-.660$ to $-.192$ in 3 varieties studied. A somewhat greater negative correlation was found between weight of glume and time of flowering. Intercomparisons of branches on a panicle showed that the heaviest seeds developed from flowers which opened simultaneously but nevertheless came from flowers which were the first to open on their respective branches.—The heaviest seed is usually the 3rd, 4th, 5th, or 6th from the apex of the panicle branch. On the contrary, the heaviest glume is found on the 1st, 5th, or 6th seed from the branch apex. The average seed weight for the different positions decreases with the progress of the time of blossoming. It may be assumed that there is some definite relationship between the weight of a seed and its position on the branch. The heaviest, lightest, and intermediate seeds generally harmonize closely with the time their respective flowers opened.—The coefficients of the correlation between position and weight of unhulled seeds range from $-.397$ to $-.659$. Since these correlations are somewhat greater than those between the actual blooming time and the seed weight, it is necessary to consider that the ordinal position of the flower on the branch may exert an equal, or greater, influence upon seed weight than the actual blooming period. The investigation shows that the weight of the chaff and the course of blossoming are very closely correlated. In contrast, the correlation is less between the blossoming time and the seed weight. This may be due to something which hinders the development of the apical seed of each branch of the panicle. Factors which determine the seed weight are not easy to define, at least in the rice plant.—*H. S. Reed*.

1387. YEARSLEY, MACLEOD. Can acquired deafness lead to congenital deafness? *Jour. Laryngol. Rhinol. and Otol.* 35: 270-271. 1920.—An account is presented with chart of "an instance in which a family with a history of acquired deafness produced offspring that were

born deaf. It is important to note that the deafness was probably otosclerosis and, therefore, of hereditary character."—*Howard J. Banker*.

1388. ZIMMERMANN, WALTER. [German rev. of: GOLDSCHMIDT, RICHARD. *Mechanismus und Physiologie der Geschlechtsbestimmung*. [The mechanism and physiology of sex determination.] 251 p., 113 fig. Gebrüder Borntraeger: Berlin, 1920.] *Zeitschr. Bot.* 13: 407-410. 1921.

HORTICULTURE

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(See also in this issue Entries 1147, 1198, 1209, 1291, 1293, 1294, 1314, 1315, 1316, 1322, 1332, 1338, 1361, 1364, 1379, 1543, 1546, 1550, 1585, 1595, 1677, 1682)

FRUITS AND GENERAL HORTICULTURE

1389. ANONYMOUS. A successful (cacao and coconut) plantation in Trinidad. *Agric. News [Barbados]* 19: 249. 1920.—An article in the Port-of-Spain Gazette, July 29, 1920, giving an account of a visit to cacao and coconut estates belonging to Mr. G. G. Brown is abstracted. Of interest is the fact that a system of drastic root pruning, carried out during forking operations, was of great benefit to the cacao fields.—*J. S. Dash*.

1390. ANONYMOUS. The green lime trade of Dominica. *Agric. News [Barbados]* 19: 265. 1920.—A new line of trade is being opened up with Mobile, Alabama, 3576 barrels and 747 boxes of fresh limes having been already shipped. It appears this market favors boxes to barrels, which are in vogue for the New York market, and material has been received for making 20,000 standard boxes of 2 cubic feet each.—*J. S. Dash*.

1391. ALDERMAN, W. H. The horticultural importance of plant associations. *Proc. Amer. Soc. Hort. Sci.* 17: 261-266. 1920 [1921].—A review is presented of the recent work on the influence of one crop on another. The suggestion is made that further work should be conducted with orchard plants to determine the relations of toxicity and plant food requirements.—*E. C. Auchter*.

1392. BABCOCK, E. B. Bud selection and the frequency of mutations. *Proc. Amer. Soc. Hort. Sci.* 17: 40-44. 1920 [1921].—The problem of bud selection as a means of increasing yields in deciduous fruits is discussed. Although some nurserymen are attempting to select their propagating buds from high-yielding parent trees, it is pointed out that the resulting trees can then be offered only as first-class stock of the variety, but nothing more until it has been proved by performance tests of the budded progeny that the character of high yield is actually transmitted. [See also *Bot. Absts.* 9, Entry 1294.]—*E. C. Auchter*.

1393. BEACH, F. H. Pruning schools in Ohio. *Proc. Amer. Soc. Hort. Sci.* 17: 70-73. 1920 [1921].—Pruning schools are rapidly taking the place of pruning demonstrations in Ohio. In 1919, 2 schools, with an attendance of 35, were held in Lawrence County. In 1920, 28 schools, with an attendance of 532, were held in 8 counties. Marked results have been secured.—*E. C. Auchter*.

1394. BELLEFORD, M. V. Note sur la culture du cacao à l'Ile de San Thomé. [Notes on cacao culture in the Island of San Thomé.] *Bull. Agric. Congo Belge* 11: 67-73. 1920.—Notes on the geography, soil and climatic conditions of the island of San Thomé are followed by a brief discussion of cacao culture. Three parasites of the cacao tree are mentioned, *Phytophthora faberi*, *Heliothrips rubrocineta*, and *Lasioidiplodia cacaocicola*, and methods of control suggested. Statistics are given regarding exportation from the island for the years 1902-1916. Two of the chief plantations, "Porto Allegre" in southern San Thomé and "Rio do Ouro" in the north, are described in some detail.—*Henri Micheels*.

1395. BIOLETTI, FREDERIC T. Permanent demonstration vineyards in California. Proc. Amer. Soc. Hort. Sci. 17: 73-79. 1920 [1921].—The author presents an outline of the methods used to carry practical information to the growers. Details of the working arrangement with the owners of vineyards are noted.—H. W. Richey.

1396. BLAIR, W. S. Fruit growing in Nova Scotia. Proc. Amer. Pomol. Soc. 35: 157-161. 1917 [1919].—The principal fruit districts are confined to the counties of Kings, Annapolis, and Hants, where a total of over 30,000 acres of apples are planted. Most of the crop produced is exported each year. There are 130 apple warehouses throughout the fruit section, 40 of these are owned by companies which have affiliated, forming the United Fruit Companies of Nova Scotia Limited. This company purchases most of the spray materials, fertilizers, seeds, etc., for the different members. Spraying is carefully done. Bearing orchards are valued at \$500 per acre. The cost of producing apples before 1917 was estimated at \$1.75 per barrel. Most of the crop is packed in barrels, and inspectors enforce a good standard. Varieties most commonly grown are Gravenstein, Ribston, Blenheim, Tompkins King, Northern Spy, Stark, and Ben Davis.—E. C. Auchter.

1397. BRIERLEY, W. G., AND W. H. KENETY. Blueberry culture in Minnesota—a report of progress. Proc. Amer. Soc. Hort. Sci. 17: 243-249. 1920 [1921].—This paper reports work done chiefly with selected plants of the "lowbush" blueberry, *Vaccinium pennsylvanicum*. Since the swamp lowbush blueberry, *V. canadense*, blooms and ripens its fruit a little later, this species has been used for the past 2 seasons. *V. corymbosum* has not been able to withstand the severe winters, but more seedlings and hybrids have recently been obtained from Dr. F. V. Coville for further trial. It was found that 1-year old rooted shoots furnished the best propagation material. A table is included showing the effect of different cultural treatments upon the stand and vigor of plants. After 3 years trial only 3 treatments, cultivating, cultivating and shading, and the 2-inch peat mulching, were retained. Manure proved to be detrimental, probably due to its alkaline nature. As regards effect on vigor and yield it appears that cultivating and peat mulching are about equally satisfactory. The number of berries in the clusters on the cultivated plots was greater than on other plots, and considerably greater than on plants grown in the wild state. The benefits derived from cultivation appear to be greater than those from efforts to renovate wild plantings.—H. W. Richey.

1398. CHANDLER, W. H. Some responses of bush fruits to fertilizers. Proc. Amer. Soc. Hort. Sci. 17: 201-204. 1920 [1921].—About $\frac{1}{10}$ acre each of American gooseberries, currants, American red raspberries, black raspberries, and blackberries was planted in 1914. At the beginning applications were made at the rate of 100 pounds of potassium chloride, 400 of acid phosphate, and 200 of sodium nitrate per acre. As the plants grew the applications were gradually increased until in 1920 the plots received treatments equivalent to 300 pounds of potassium chloride, 600 of acid phosphate, and 350 of sodium nitrate per acre. Where manure, tankage, or dried blood was used, amounts were applied furnishing approximately the amount of nitrogen applied to a plot receiving sodium nitrate.—In comparison with corn, planted in a portion of the gooseberry and currant plots where the berry plants were removed, the evidence seemed conclusive that gooseberries showed no response to phosphorus. Since the soil was so poorly adapted to blackberries and red and black raspberries, it was not possible to determine whether or not any of them would respond to phosphorus though certainly none responded strikingly.—In plots of black raspberries and red raspberries receiving nitrogen, the total cane growth was respectively 1.004 and 1.87 times that of plots receiving no nitrogen; the blackberries showed no measurable response. The application of nitrogen benefited the red raspberry much less in yield than in growth, possibly because the variety used (Cuthbert) suckers very readily.—The currants made no measurable response to any element. Gooseberries responded to nitrogen and possibly to potassium, the response to manure being greater than to complete mineral fertilizers. In the case of the Cuthbert raspberry, the response to sodium nitrate seemed to be greater than to an equal amount of nitrogen in manure, tankage, or dried blood.—H. W. Richey.

1399. CHURCH, F. A. Safeguarding the ripe olive. *Pharm. Era* 53: 293-294. 2 fig. 1920.—An account is given of the laws regulating the packing of ripe olives in California, following several fatal cases of poisoning.—*C. M. Sterling.*
1400. CLARK, T. W. Methods of testing cacao beans. *Agric. News* [Barbados] 19: 254-255. 1920.—The article discusses the methods of testing and the demands of buyers, indicating how a bean best suited to the latter is produced. In this connection information is given enabling the planter to make tests for himself and thus secure an indication of the value of his product.—*J. S. Dash.*
1401. COLBY, A. S. Pruning notes on blackberry varieties. *Proc. Amer. Soc. Hort. Sci.* 17: 241-242. 1920 [1921].—A brief discussion is given of the general pruning of blackberries in Illinois. Tests were made with 11 varieties in duplicate rows, the laterals in 1 row being headed back severely whereas those in the other were not headed back. The author grouped the varieties as follows: "First, those which carry their cluster-buds well in towards the base of the laterals and well down on the canes; second, those which carry their buds out nearer the tips of the laterals and canes; and, third, those whose buds are scattered fairly well along the production wood." Ward and Lawton, with laterals having from 8 to 14 buds with the outer 5 without fruiting clusters, belong to the 1st class; cutting back the laterals $\frac{1}{2}$ results in little reduction in the yield. Early King, Taylor, and Wachusett, with an average of 15 buds to the lateral, belong to the 2nd group. Since the first 3 to 5 buds are not fruitful, pruning off more than $\frac{1}{2}$ decreases the yield. Snyder, Ancient Briton, Wilson, Ohmer, Eldorado, and Mersereau, the most vigorous and productive domestic varieties, belong to the 3rd group, in which the cluster buds are fairly evenly distributed along the producing wood. Severity of pruning is more necessary in this group, and, as many of the laterals carry as high as 18 buds, they may be cut back $\frac{1}{2}$.—*H. W. Richey.*
1402. COLBY, G. E. California fruits. *Monthly Bull. Dept. Agric. California* 10: 35-39. 1921.
1403. CONDIT, I. J. Getting the people acquainted with the great American fig. *Associated Grower* 1⁶: 11-12. 1920.—The Calimyrna (the Smyrna of California) has a golden yellow color, thin skin, amber pulp, and a rich flavor. It is an excellent fresh fruit product. Caprification is emphasized as an essential detail in the culture of this fig.—*E. L. Overholser.*
1404. COOPER, J. R. Preliminary report on the effect of fertilizers in apple orchards in the Ozark region. *Proc. Amer. Soc. Hort. Sci.* 17: 190-193. 1920 [1921].—A series of plot fertilizer experiments in bearing apple orchards, with 5 complete series of elements used alone and in combinations, 3 series in young orchards not yet in bearing, 2 in bearing peach orchards, and some in vineyards and strawberry fields are being carried on. Nitrogen has given the greatest promise of direct results. In orchards growing on poor, leachy soils the set of fruit was increased from $1\frac{1}{2}$ to 10 per cent, with 40 per cent of the spurs blooming, and from 1 to $5\frac{1}{2}$ per cent, with 81 per cent of the spurs blooming; a larger percentage of the fruit which set was carried to maturity. In fertile heavy soils, or soils which had previously been manured little or no benefit was noticeable in the set. In 1 orchard which had been nitrated in the previous season, as well as manured, the application of more nitrate the following year seemed to decrease the set over that in the unfertilized plot. No effect on the set of fruit was observed from the use of either phosphorus or potash.—Judicious pruning stimulated the effect of nitrogen for a single season. Continued pruning was inadvisable as a method of procuring a successful set of fruit. The author states "Our observations have led us to believe that the whole tree performs as more or less of a unit and that the difference in performance of different parts is due largely to location with regard to food and water supply and other conditions of environment. Our record of spur growth follows very closely the description given by ROBERTS. It seems to us, however, that there is more mass than individual action and that the performance of different classes of spurs is due largely to location and finally to the available supply of plant food."—The author finds that it is possible to change the performance

of spurs by pruning and by controlling the nitrogen and water supplies. Using the percentage and rapidity of germination of pollen as a standard, the vitality of pollen was found to increase either following a special pruning or the early use of quickly available nitrogen. Less frost injury was found in the sod portion of 1 orchard than in the cultivated part. A distinct relation was found between size of apple and number of contained well-developed seeds. There was a tendency to poorer color of fruit on all nitrogen plots. The fruit also matured somewhat later and was considerably larger in size.—*E. C. Auchter.*

1405. COX, U. T. The Rome Beauty apple in Ohio. *Proc. Amer. Pomol. Soc.* 35: 187-189. 1917 [1919].—The origin and early history of the Rome Beauty apple is recorded. The first spraying tests in Ohio were made in the author's orchard in 1890. Nitrate of soda for the trees and acid phosphate for the sod have proved beneficial; potash has not been beneficial. Several bud sports of the Rome Beauty have originated on the author's farm.—*E. C. Auchter.*

1406. CRANFIELD, FREDERIC. Cherry culture in Wisconsin. *Proc. Amer. Pomol. Soc.* 35: 122-125. 1917 [1919].—Cherries have been growing in Wisconsin for at least 300 years. The first commercial cherry orchard was planted in Door County in 1893. There are now approximately 5000 acres in this county alone. The sour cherry is grown almost exclusively. The methods of cultivation, pruning, spraying, harvesting, packing, and marketing as used in Wisconsin are described.—*E. C. Auchter.*

1407. CULLINAN, F. P. Transpiration studies with the apple. *Proc. Amer. Soc. Hort. Sci.* 17: 232-240. 1920 [1921].—In 1918 studies were made on 2 2-year old trees, one severely pruned, the other unpruned. The transpiration data obtained indicated that the pruned tree transpired relatively more water per unit area of leaf surface than the unpruned. Both trees made exactly the same gain in growth during that season, yet the unpruned trees had about 56 per cent greater leaf area than the pruned. Because of the greater leaf area it is probable that the unpruned tree would actually transpire more water than the pruned tree, yet the rate of transpiration per unit area of leaf surface was greater in the latter.—Other studies were made with mature apple trees, and also with pepper plants [*Capsicum*] grown in the greenhouse. The latter were grown under varying conditions of moisture, nitrogen, and pruning. "The data in all cases show the very marked effect of the removal of small portions of the stem and foliage in the reduction of the total leaf surface and the amount of dry matter produced." It is concluded that "the mere passage of water through the plant has no influence on assimilation activity, provided the water supply does not fall below a certain minimum required to maintain the turgor of the cells."—*E. C. Auchter.*

1408. CUNLIFFE, R. S. Propagation of some tropical fruits: cultivation of the pawpaw. *Agric. News [Barbados]* 19: 246-247, 262-263. 1920.—*Carica papaya* presents many and varied forms. The trees may vary from 8 feet high and 4 inches in diameter to 20 feet high and 2 feet in diameter. The fruits may be oval, roundish, pear-shaped, or oblong, weighing from a few ounces to 25 pounds. When immature, the fruits are green; when ripe, of any shade between green and purple, with much meat or little, many seeds or none. Sexually, the differences are even greater, and on this basis some 12 or 13 forms have been recognized, some of which may change over, under certain conditions, to the opposite sex. Some trees have purely staminate flowers, others purely pistillate. Some bear hermaphrodite flowers, some both staminate and pistillate flowers. Successful cultivation depends on reducing unproductive male trees to a minimum, increasing the producing capacity of bearing trees, and improving the fruits. Usually cultivated from seed, the first of the above objects is attained by a rigid and continual selection of seed. This is continued because types are apt to break up, especially owing to sudden changes of environment. Another method of propagation which has given some success is the grafting of scions of selected stock on young seedlings in very early stages of development. The plants bear in about 12 months from seed.—*J. S. Dash.*

1409. DANIEL, LUCIEN. À propos des greffes de soleil sur Topinambour. [Concerning the grafts of Topinambour sunflowers.] *Compt. Rend. Acad. Sci. Paris* 172: 610-612. 1921.—

A study of the tubercles formed on the stock of grafts of *Helianthus orgyalis* is presented. The number, volume, and weight of these tubercles were ascertained and the inulin content studied. Similar studies were made of the scions of Topinambour grafts on these stocks, and it is concluded that the sunflower is not the only source of the inulin present in these scions.—C. H. Farr.

1410. DORSEY, M. J., AND J. W. BUSHNELL. The hardiness problem. Proc. Amer. Soc. Hort. Sci. 17: 210-222. 1920 [1921].—The authors give a brief résumé of the years, localities, extent, and types of winter injury to various kinds of dormant fruit trees, together with short discussion of horticultural practices which have developed to mitigate winter injury. In summarizing the experimental work on the rest period of plants the authors state "Evidence seems to indicate that a plant is more susceptible to winter injury after the rest period is broken, although there are indications that there is a killing temperature for all species of woody plants even while in deep dormancy. This temperature is seldom if ever reached for some. The investigations of the rest period to date show an intimate relationship between dormancy and hardiness and also furnish an accurate guide to cultural methods." Various experiments are cited in which the hardiness was tested of the seedlings and cuttings of the same species but collected from the southern central and northern range of the species. It was found that, as a rule, the progeny were progressively less hardy the more southerly their origin. Whitten, working with peaches, has shown that there is no permanent adjustment in the length of the growing season of a variety as there is in a species. The authors conclude "it may be safely assumed, since the species is heterozygous, that the plants of the species in the north are genetically different from those farther south in that only those possessing the factors for hardiness have survived." In discussing the physiological phase of hardiness it appears to the authors that the plant as a whole does not react as a unit but some tissues of the tree are more subject to injury than others. A brief discussion is given of the theories of hardiness advanced by recent investigators.—H. W. Richey.

1411. DUNLOP, W. R. A Guatemalan coffee estate. Agric. News [Barbados] 20: 114, 115. 1921.—This article discusses in a general way the conditions, methods employed, etc., on a coffee estate of 2000 acres situated between the altitudes of 2000 and 5000 feet. High grade coffee is produced, and the author thinks this is due to the special conditions of altitude, climate, etc., prevailing.—J. S. Dash.

1412. FARMER, L. J. Are fall- or ever-blooming strawberries a success? Proc. Amer. Pomol. Soc. 35: 132-137. Pl. 32, fig. 3. 1917 [1919].—A description of different fall- and ever-bearing strawberry varieties is given. The origin and history of fall-bearing strawberries is included, and the author believes that they are now past the experimental stage, being a decided success under local conditions in New York.—E. C. Auchter.

1413. GOURLEY, J. H. The commercial production of the blueberry. Proc. Amer. Pomol. Soc. 35: 138-144. 1917 [1919].—The geographical distribution of the crop is shown. The New England states, with Maine leading, produce most of the crop in this country. In 1914, 151,636 cases of blueberries were packed in the United States. A good yield is 2000 quarts per acre. Picking privileges and methods of picking are discussed. The lowbush pastures are generally burned over once in 3 years. The best berries are produced on the new vigorous shoots.—E. C. Auchter.

1414. GOURLEY, J. H. The effect of shading some horticultural plants. Proc. Amer. Soc. Hort. Sci. 17: 256-260. 1920 [1921].—This paper reports the observations of the effects of shading apple, peach, and plum trees, and various kinds of flowers and vegetables in New Hampshire. During the hottest weather the temperature was always highest in the shade, while in cool weather the temperature in the shade was slightly higher during the day and lower at night than the temperature in the open. The shaded leaves were much larger and much thinner than the unshaded and wilted more rapidly. A difference in structure was also noted. In the trees the growth in the shade was greater in length, more slender, and less

branched. The same was true of the smaller plants, in which, furthermore, the root systems were greatly restricted. It was noted that comparatively few blossoms formed in the shade, but that the plants in the open bloomed normally.—*H. W. Richey.*

1415. GRAY, G. P., AND H. J. RYAN. Reduced acidity in oranges caused by certain sprays. *Monthly Bull. Dept. Agric. California* 10: 11-33. 1921.—The acidity of both Navel and Valencia oranges is greatly reduced when a spray composed of soap, sodium carbonate, sulphur and lead arsenate is applied to the trees, even for 1 season. This reduction in acidity amounts to more than 50 per cent in some cases. The physiological phenomenon involved is not known. The arsenic compound, which seems to be chiefly responsible for the effect, is probably slowly converted, first into a soluble form. The facts do not correlate the reduction of acidity with local absorption of the spray by the fruit, the action of the spray probably being systemic, affecting the whole tree.—*E. L. Overholser.*

1416. GREENE, L. Orchard soil management studies in Indiana. *Proc. Amer. Soc. Hort. Sci.* 17: 185-190. 1920 [1921].—The author believes that soil moisture is one of the limiting factors in orchard production. He suggests that even though nitrates are added to sod orchards, conservation of soil moisture is still necessary. The differences appearing between plots A and B are attributed to soil moisture conditions rather than to plant food conditions alone. The experiments show that growth and production are very closely coordinated. The author states "Under the conditions of the experiments at Laurel, 2 types of orchard soil management have supplied moisture in sufficient quantities to produce sufficient growth to show profitable production. These 2 are clean cultivation with cover crop, and straw mulch applied at the rate of from seventy-five pounds per tree in the early history of the orchard to one hundred and fifty pounds per tree during the later years." Where cultivation can be practiced without erosion, the writer believes it will undoubtedly prove to be, in most cases, the most economical method of soil management. "Under certain conditions of cheap mulching material the straw mulch will undoubtedly prove more economical than will cultivation. It is altogether probable that a sufficient amount of mulching material can be grown between the trees if the entire orchard is fertilized for grass production as shown by Professor Ballou in southern Ohio."—"One of the dangers which confronts the practical orchardist who adopts the sod mulch method, is that it is very easy to neglect the supply of mulch material necessary to properly conserve moisture, and the trees will suffer accordingly. In other words, sod mulch is the system of the careless orchardist, and while when rightly used it will probably produce as good fruit with better color at very near the same net profit per acre, it is a system which needs careful attention to be made successful."—*E. C. Auchter.*

1417. HARDY, F. The application of fertilizers in orchard cultivation. *Agric. News [Barbados]* 20: 74. 1921.—This paper considers a communication from Mr Keys, Asst. Curator of the Dominica Botanic Station, entitled *The Necessity for Clear Statements in Regard to the Rate of Applying Artificial Fertilizers in Orchard Fertilization*, in which the author makes a plea for the units of weight mentioned in reports of such experiments to be expressed per tree and not per acre, since very often the number of trees per acre is not stated.—*J. S. Dash.*

1418. HEDRICK, U. P. Report of the National Research Council Committee. *Proc. Amer. Soc. Hort. Sci.* 17: 276-279. 1920 [1921].—The committee felt that the American Society for Horticultural Science, through the cooperation of the National Research Council, could well take up the question of establishing arboreal plantings of species of cultivated fruits and nuts in the different parts of the U. S. A. It is planned as a preliminary step to make a survey of living arboreal plant material available for breeding purposes at arboretums and other places in the U. S. A. and Canada. Dr. GALLOWAY was asked to make this survey. The findings will be published either as a government bulletin or as a bulletin from the National Research Council. After this report is secured, future plans for organizing and developing the different arboreal plantings can be made.—*E. C. Auchter.*

1419. HEINICKE, A. J. The seed content and the position of the fruit as factors influencing stippen in apples. Proc. Amer. Soc. Hort. Sci. 17: 225-232. 1920 [1921].—The author finds: (1) That the early form of stippen, or bitter-pit, occurs more often on lateral fruits of a cluster than on central ones; (2) that the disease is more prevalent on fruit of spurs near the basal portions of the branches; (3) that fruits on branches making a vigorous growth are attacked less; (4) that fruits with few seeds are more susceptible than those with many seeds; and (5) that stippen seems to be associated with earlier maturity. The stippen appearing after the fruit is harvested is more prevalent on many-seeded fruits. The author also noted that the conditions which seemed to retard the development of the early form of stippen often were associated with the presence of water core. It is concluded that "the bitter pit which appears in the mature fruit that is still attached to the tree seems to be associated with conditions favorable for incipient wilting, but unfavorable for an abundant, or even an adequate, supply of nutrients. On the other hand, the form of stippen which does not become manifest until the fruit is harvested, or generally several weeks later, seems to be associated with conditions that favor an abundant or even an excessive supply of water and the other size-producing nutrients." The author believes, however, that the so-called true bitter-pit is probably due to the same causes which bring about the earlier appearing stippen.—H. W. Richey.

1420. HIGGINS, J. EDGAR. Report of the Horticultural Division. Hawaii Agric. Exp. Sta. Rept. 1919: 16-40. Pl. 1-5. 1920.—Report of investigations conducted with Macadamia nuts, avocados, mangoes, papaya (*Sola* variety), litchi, coffee, vanilla, pineapples, and algaroba.—J. M. Westgate.

1421. HOWARD, W. L. Use of dust sprays in California. Proc. Amer. Soc. Hort. Sci. 17: 106-108. 1920 [1921].—Dry sulphur has always been the standard remedy for mildew on grapes. In no other instance has a dry spray proved to be of practical importance in California as a fungicide, and wet sprays are used almost exclusively for controlling diseases.—Sulphur dust has been found very effective against red spider on almond, peach, and plum trees. It is believed that the heat of the sun slowly volatilizes the sulphur and that these slowly liberated fumes kill the mites. Lately a new dust spray, known as Nicodust, composed of nicotine sulphate in 2, 5, and 10 per cent combinations with kaolin clay as a carrier, has been giving success with certain insects. It was first used against leaf aphid on walnut, a 2 per cent dust proving successful. A 5 per cent Nicodust successfully controlled thrips on prunes, pears, and nursery stock. This dust has not proved effective against red spider, possibly because the liberation of the nicotine fumes is completed in about 3 hours, whereas sulphur fumes are liberated more gradually, continuing for days. Because Nicodust kills by the rapid liberation of nicotine fumes it is necessary, under California conditions, that the dust be applied to the trees during the warm part of the day.—Arsenate of lead as a dust has never been used, except in a very limited way, against such insects as the codling moth; where employed it was not a success. The future development of dry sprays as insecticides seems to lie in the direction of those that give off fumes rather than in the use of arsenicals.—H. W. Richey.

1422. JONES, J. Report on the Agricultural Department, Dominica. Rept. Imp. Dept. Agric. West Indies 1919-1920: 44. 1921.—Interesting plants in the gardens, and of which some account is given, are: *Baikiaea insignis*, which during 5 months bore from 50 to 100 delicately scented flowers which opened between 4 and 5 o'clock in the afternoon and faded the next morning; *B. Eminii*, *Amherstia nobilis*, *Pongamia glabra*, *Dequelia microphylla*, and *Chenopodium ambrosioides* L. (Mexican tea).—From certain notes on the nurseries it appears that soils are greatly exhausted by the constant growing of lime seedlings, and a simple method of maintaining fertility has been evolved. The beds are 4½ to 5 feet wide, separated by paths 3 to 3½ in width. After the beds are planted, accumulations of weeds, grass, and leaves are placed in the paths, the latter having considerable half-rotted matter by the time the seedlings are removed. The beds for the next crop of seedlings occupy the positions of the former paths. This practice keeps up the fertility of the beds indefinitely so long as sufficient humus is supplied.—Among the economic plants, *Momordica cochinchinensis* flowered and was hand-

pollinated. The first fruit weighed $3\frac{1}{4}$ pounds. The seeds of this plant yield an oil of remarkable drying properties; besides, the plant is a very desirable climbing ornamental, quickly covering walls or arbors and producing striking flowers.—It is stated that some of the best flowered mangoes are the poorest shippers. Selection work with mangoes and avocados to supply the Canadian market is urged. Trials with avocados indicate that varieties from the Mexican highlands are not satisfactory for growing on West Indian island coasts. Onion culture is making considerable progress; on one estate some 30,000 pounds were produced last season. It has been proved that onion seed can be produced in Dominica, but for the present planters depend on supplies of Teneriffe seed. Camphor experimentation is still in progress.—Among the principal exports, the lime crop shows an increase of 12,000 barrels over the average annual output for several years prior to 1918. It is pointed out that the Florida lime industry affects but little the green lime trade of Dominica, absorbing, as a matter of fact, only 2 per cent of the Dominica lime crop.—It has hitherto been very difficult to obtain reliable figures as to the cacao production, owing to smuggling to the neighboring French islands. Market conditions having changed, however, the last cacao crop was shipped in the proper way. Thus the figures of export for 1919, 700,387 pounds, valued at \$150,000, more closely represents the actual crop figures. On page 19 is given a complete list of the agricultural exports for the years 1917–18–19.—Discussing the present agricultural situation at length, the author urges greater attention to cultural methods, the increased use of green and artificial manures, the regular employment of labor for the benefit of both the laborer and the plantation, the establishment of land settlement schemes for laborers, etc. On page 20 is given a résumé of the plant legislation now in force in Dominica. On p. 21–30 an account is given of the condition of the lime experiment station, with valuable notes as to methods employed; manurial experiments; the comparison between spineless limes budded on sour orange stocks and grown with *Canavalia* for green dressing, common limes similarly budded and grown with *Tephrosia*, common limes similarly budded and grown without green dressings, and common seedling limes clean-weeded; new lines of experimentation, etc. Cacao manurial experiments are presented in tabular form and fully discussed on p. 37–44. It is observed from these that 20 years of trials show that a complete manure is absolutely essential to successful cacao cultivation, and it now remains to determine the effects of various forms of nitrogen, phosphate and potash.—J. S. Dash.

1423. JONES, J. Root pruning of cacao trees for improvement of production. Agric. News [Barbados] 19: 404. 1920.—It has been noted that poor-bearing cacao trees often present a large and very healthy appearance whereas neighboring heavy-bearing trees appear comparatively undeveloped or less healthy. The question having arisen whether the low yield was not often due to unusual vegetative vigor, 1 of 2 low-yielding trees, growing in a plot of trees yielding 100 pods per tree per annum, was carefully root-pruned. The original average yield of these 2 trees was 25–30 pods per annum. After the pruning the treated tree bore a crop of 78 fully grown pods while the unpruned one beside it bore 14. While the result is not conclusive in itself, it points to a new field for extensive trials, since root pruning would be infinitely easier and possibly more successful than cutting back and budding developed trees.—J. S. Dash.

1424. KNOWLTON, H. E. Methods in apple pollination experiments. Proc. Amer. Soc. Hort. Sci. 17: 44–47. 1920 [1921].—Attention is drawn to the fact that great care and accuracy should be used in carrying on apple pollination work in the field. A refinement of methods and the elimination of as many sources of error as possible are suggested.—The use of the "bagging" method is questioned as compared with the practice of covering the entire tree with a muslin frame. It is suggested that temperature and light conditions are more abnormal under bags. At least 500 blossoms should be worked in each case, whether cross- or self-pollinations are made. Since weather conditions at blossoming time materially affect the percentage of set, the author states that the results secured on different days or in different years should not be summarized and averaged. As much work as possible should be done in 1 day under the same conditions, and a careful record of the weather conditions should be tabulated and reported as part of the data.—E. C. Auchter.

1425. LAFFER, H. E. Pruning of the vine. Agric. Gaz. New South Wales 31: 655-661. 1920; 32: 119-126, 339-342. 13 fig. 1921.—The author discusses various methods of pruning, such as the Thomery Spalier system, Bordelais Spalier system, and Cazenave's Cordon system. The method of training the home vine is also discussed.—*L. R. Waldron*.
1426. MANEY, T. J., AND H. H. PLAGGE. Fruit bud production in the apple. Proc. Amer. Soc. Hort. Sci. 17: 250-256. 1920 [1921].—The paper records a study of fruit-bud production in an Iowa orchard used since 1910 for a study of various cultural methods. The production of fruit buds on 1-year old wood and on spurs of different ages was observed and groupings made accordingly. A correlation was noted between the amount of new growth,—and the consequent development of spurs,—and fruit-bud formation. The conclusion reached is to the effect that, if twig growth and productiveness are related, the logical means of effecting fruitfulness is by proper pruning methods, soil culture and fertilization, use of hardy stock, proper distance of planting, and spraying.—*E. C. Auchter*.
1427. MANUEL, H. L. Vineyard notes for May. Agric. Gaz. New South Wales 32: 348. 1921.
1428. MATTHEWS, C. D. Report of the Division of Horticulture. Ann. Rept. North Carolina Agric. Exp. Sta. 43: 46-51. 1920 [1921].—A brief statement is presented of cultural studies with apples, peaches, pecans, strawberries, Irish potatoes, sweet potatoes, and cabbage.—*F. A. Wolf*.
1429. MILLER, E. CYRUS. Commercial apple growing in Massachusetts. Proc. Amer. Pomol. Soc. 35: 172-174. 1917 [1919].—Personal experiences in growing apples in Massachusetts since 1888 are given. Prices received for the crop in different years are shown.—*E. C. Auchter*.
1430. MURRILL, W. A. The papaya, or tree melon. Sci. Amer. 124: 191, 200. 4 fig. 1921.—The article describes the species *Carica Papaya*.—*Chas. H. Otis*.
1431. NEER, F. E. Comparisons between sun-drying and stack-drying. Monthly Bull. Dept. Agric. California 10: 70-72. 1921.—In stack-drying, fruit should first be exposed to the sun for about half a day in order to get the color desired. The sugar content of sun- and stack-dried products is the same, but the eating quality of the stack-dried product is superior.—*E. L. Overholser*.
1432. OVERHOLSER, E. L. The peach tree after fruit harvest. Associated Grower 16: 5, 6. 1920.—The author quotes scientific facts to support the statement that certain cultural methods should be observed after the fruit is harvested in order to obtain the maximum amount of stored food, a concentrated sap, and the formation of plump fruit buds.—*F. de Villiers*.
1433. PATTERSON, J. M. Commercial pecan culture—a new industry. Proc. Amer. Pomol. Soc. 35: 144-156. 2 pl. 1917 [1919].—The early history and origin of pecans is discussed. The southern states produce practically all of the commercial crop. The future of the pecan industry is depicted as being very bright. As regards food value in terms of calories, 1.1 pounds of pecans are equal to 1.5 pounds of bacon, 2.45 of smoked ham, 4.1 of porterhouse steak, 4.89 of mutton, or 5.35 of chicken. As a food, pecans are therefore reasonable in price when compared with various meats. It is claimed that pecans are not more subject to insect enemies or diseases than common fruits. Cooperative packing and marketing associations are now being formed in the U. S. A.—*E. C. Auchter*.
1434. PICKETT, B. S. Responses of a young peach orchard to certain cover crops and fertilizer treatments. Proc. Amer. Soc. Hort. Sci. 17: 193-197. 1920 [1921].—Cover crop and fertilizer experiments were carried on near Olney, Richland County, Illinois. Forty-three major plots, each containing 16 trees, were used. Guard rows between the different plots

were provided for. The orchard was started in 1917 and the experiments begun in the same year. In 1920, a good crop of fruit was produced and yield and growth records were secured. The following observations were made: (1) As compared with clean cultivation, cow peas used as a cover crop, planted July 10-15, were detrimental to the growth and yield of peach trees; (2) the addition of a fertilizer carrying soluble potassium completely corrected the difficulty; (3) the addition of a fertilizer carrying soluble nitrogen partly corrected the difficulty; (4) the addition of a fertilizer carrying phosphorus gave uncertain results; (5) the addition of both nitrogen and potassium somewhat increased the yield of cover-crop plats over clean cultivation plats; (6) rye following cow peas, used as a winter cover, was very detrimental, almost deadly, in effect.—*E. C. Auchter*.

1435. POLE EVANS, I. B., MARY R. H. THOMSON, V. A. PUTTERILL, AND GEO. HOBSON. Further investigations into the cause of wastage in export citrus fruits from South Africa. Union of South Africa Dept. Agric. Bull. Gen. Ser. 1. 48 p., 54 fig. 1921.—The investigations include an examination of the methods of handling the fruit and of the channels through which it passes from the orchard to the market. Orchards, packing sheds, railway trucks, cold stores, and box-wood were examined and inoculation experiments carried out with the various fungi found. It is shown, however, that wastage is due to the olive green mould, *Penicillium digitatum*, and to the blue green mould, *Penicillium italicum*. These moulds are apparently incapable of attacking perfectly sound fruits, hence the danger of wounded fruits is pointed out, also the many sources of bruising. Special attention is drawn to the dangerous practice of packing with an excessive bulge. Experimental consignments of fruit, picked, graded, and packed by specially selected men, were put on the London market with very favorable results. The investigations show that with ordinary care and intelligent handling, South African citrus fruits can be placed on the overseas markets with only a negligible amount of waste. The scope and justification for continuing the investigation are pointed out.—*M. R. H. Thomson*.

1436. POPENOE, WILSON. Tropical fruits. Proc. Amer. Pomol. Soc. 35: 196-214. 1917 [1919].—The common and scientific names of many tropical fruits are listed. Brief discussions concerning the names of several fruits are given.—*E. C. Auchter*.

1437. REES, R. W. Central fruit packing associations as an extension project. Proc. Amer. Soc. Hort. Sci. 17: 80-83. 1920 [1921].—In 1918, at the request of a group of New York fruit growers for aid in marketing fruit, the extension specialist and county agent helped organize a community packing house. The details of the organization were worked out in several meetings with a committee of the growers. In 1918, 6 community packing houses were operated; in 1919, 7 more were added, and in 1920, 12 additional ones were organized. In 1920, 21 of these locals were federated into a central association.—*E. C. Auchter*.

1438. ROBERTS, R. H. Experiments upon apple tree nutrition. Proc. Amer. Soc. Hort. Sci. 17: 197-200. 1920 [1921].—In nutritional studies with apple trees, the author finds fruitfulness apparently closely related to nutritional conditions. His recent data indicate that blossom-bud formation has a definite relation to the nature and amount of reserve materials in the tree. Yield records are not considered as of as much importance as certain other growth and blossom records of spurs, terminals, laterals, etc.; a suggested list of desirable data is included. It is felt that the relation of growth conditions to fruitfulness is a rather constant matter. Although the internal composition of the tree is important, it is felt that such knowledge is not necessary in a practical measurement of the vegetative or fruiting condition of the tree. The author states "There are correlated growth conditions which answer very well for purposes of experimentation if it is constantly remembered that they are not the factors giving fruitfulness, but are, in turn, only the effects of internal conditions."—*E. C. Auchter*.

1439. ROGERS, A. J. Sweet cherry culture. Proc. Amer. Pomol. Soc. 35: 118-121. 1917 [1919].—The author gives his experience in the growing, harvesting, packing, and marketing of cherries.—*E. C. Auchter*.

1440. TAFT, L. R. Commercial cherry culture. *Proc. Amer. Pomol. Soc.* 35: 106-118. 1917 [1919].—Statistics from the 1910 census are used to show the number of trees and size and value of the cherry crop in the 7 leading states. A map of the Michigan fruit belt is given with data on the effect of Lake Michigan on the land temperature. Recommendations are made for the proper soil and site for orchards, age of trees for planting, best varieties, and cultural treatment. The proper methods of harvesting and marketing the crop are discussed, together with the extent of the canning industry in Michigan. It is also suggested that sour cherries could profitably be grown in Massachusetts and other New England states.—*E. C. Auchter.*

1441. TERRY, H. B. Pruning of deciduous trees. *Jour. Dept. Agric. South Africa* 2: 268-274, 358-371, 457-461. *Fig. 7-27.* 1921.

1442. TRIBOLET, J. Mangoes, pawpaws, and avocado pears. *Jour. Dept. Agric. South Africa* 2: 338-339. 1921.

1443. TUFTS, W. P. Factors in pruning the bearing peach. *Associated Grower* 1¹⁰: 36-37. 1920.

1444. TURNER, A. G. Citrus industry. Report on visit to California. *Rhodesia Agric. Jour.* 18: 142-166. 6 *pl.* 1921.

1445. VANDERVORT, H. S. A demonstration community packing house as an extension activity. *Proc. Amer. Soc. Hort. Sci.* 17: 83-86. 1920 [1921].—A demonstration community packing house was constructed at state expense at Inwood, West Virginia, in 1920. During the first season (1920) 108 cars were shipped from the plant. Growers were taught the great value of proper spraying and packing as a prerequisite for successful marketing.—*E. C. Auchter.*

1446. WARING, J. H. The probable value of trunk circumference as an adjunct to fruit yield in interpreting apple orchard experiments. *Proc. Amer. Soc. Hort. Sci.* 17: 179-185. 1920 [1921].—Correlation studies were made between the inches gained in trunk circumference and the pounds of fruit produced in several Pennsylvania orchards where fertilizer experiments had previously been carried on. In addition, the coefficients of variability for circumference and yield were determined.—“In-as-much as trunk circumference records used in conjunction with records of the production of fruit, have enabled us to reach certain truths that had not been discovered by our study of production records alone, we conclude that trunk circumference records do have a decided value which may closely approach the value of the yield records themselves as an aid to the correct interpretation of results in apple orchard experiments.”—*E. C. Auchter.*

1447. WEBB, WESLEY. Progress of pomology on the Delaware-Chesapeake peninsula. *Proc. Amer. Pomol. Soc.* 35: 182-186. 1917 [1919].—The early history of fruit growing in Delaware is given. Attention is called to the fact that the Peninsula leads the world in strawberry production. The peach fertilization experiments of C. A. McCUE, which demonstrate the value of nitrogen in peach orchards, are reviewed. The apple varieties commonly grown are Stayman Winesap, Yellow Transparent, Early Ripe, Williams Early Red, Jonathan, Grimes, Rome Beauty, and Paragon. Apple grading laws and fruit sizing machines have helped to raise the standards of packing.—*E. C. Auchter.*

1448. WESTER, P. J. Plant propagation and fruit culture in the tropics. *Bur. Agric. Philippine Is. Bull.* 32. 134 *p.*, 23 *pl.* 1920.—The bulletin is a general manual covering the field indicated by the title. While this publication applies primarily to the subjects in the Philippines, much of the data assembled are applicable to other tropical countries, and it should be of great value to all residents in the tropics who are interested in the subject.—*E. D. Merrill.*

1449. WESTER, P. J. The breadfruit. Philippine Agric. Rev. 13: 221-229. *Pl. 1-4*. 1920.—A plea is made for the more general utilization of this important food plant. Directions are given for propagating the seedless form.—*E. D. Merrill*.

1450. WESTER, P. J. The coconut palm, its culture and uses. Bur. Agric. Philippine Is. Bull. 35. 73 p., 23 pl., map. 1921.—The bulletin is a general publication with a special view to conditions existing in the Philippines in reference to the culture of the coconut palm.—*E. D. Merrill*.

1451. WESTER, P. J. The cultivation and uses of roselle. Philippine Agric. Rev. 13: 89-99. *Pl. 1-4*. 1920.—A plea is made for the more general utilization of this plant, *Hibiscus sabdariffa* Linn.—*E. D. Merrill*.

1452. WESTER, P. J. The preservation of tropical fruits. Philippine Agric. Rev. 13: 173-185. *Pl. 1-4*. 1920.—General directions are given for preserving the more common tropical fruits with a view to popularizing their use among Caucasian residents in the tropics.—*E. D. Merrill*.

FLORICULTURE AND ORNAMENTAL HORTICULTURE

1453. ANONYMOUS. Native plants at the National Botanic Gardens. No. 6. *Greyia Sutherlandi*. No. 7. *Kniphofia* sp. South African Gard. 11: 81-131. 2 fig. 1921.

1454. BOYNTON, KENNETH R. *Ceratostigma plumbaginoides*. Addisonia 5: 45, 46. *Pl. 183 (colored)*. 1920.—The species is a perennial herb, native of China. It has been in cultivation for the past 50 years and is a desirable border plant.—*T. J. Fitzpatrick*.

1455. BOYNTON, KENNETH R. *Monarda media*. Addisonia 5: 39. *Pl. 180 (colored)*. 1920.—This mint is a native of northeastern U. S. A. and has been in cultivation nearly 3 centuries in the U. S. A. and Europe.—*T. J. Fitzpatrick*.

1456. COX, GERAN N. Raising hybrid rhododendrons. Gard. Chron. 69: 126-127. 1921.—The author states that he has seen at least 53 species on the Burmese-Chinese border and that at least 250 new species have been discovered in eastern Asia within the last 10 years. There are an enormous number of existing hybrids, and at least 50 per cent of these are not cultivated at Caerhays. He suggests a central authority like the Rhododendron Society to classify and interpret them for gardeners.—*P. L. Ricker*.

1457. MORRIS, ROBERT T. Notes on nut bearing coniferous trees. Proc. Amer. Pomol. Soc. 35: 156-158. 2 pl. 1917 [1919].—Descriptions are given of the nuts and other bi-products of several nut-bearing coniferous trees. It is suggested that, because of various economic features, it is not improbable that farmers 1000 years from the present time will include nut-bearing pine trees among their standard crops.—*E. C. Auchter*.

1458. MOTTET, S. Les Benoites. [Geums.] Revue Hort. 92: 160. 1 pl (colored). 1920.—The 2 varieties, Mrs. Bradshaw and a similar large-flowered, double, scarlet form of *Geum coccineum*, the orange flowered *G. Heldreichii* and its variety *splendens*, which has clear yellow flowers, are most generally useful. *G. montanum*, *G. pyrenaicum*, *G. triflorum*, and *G. reptans* are useful in semi-shaded situations in rockeries; all are easily propagated.—*E. J. Kraus*.

1459. NASH, GEORGE V. *Clethra barbinensis*. Addisonia 5: 41. *Pl. 181 (colored)*. 1920.—The species is a shrub or small tree, native of eastern Asia, which propagates readily in moist peaty or sandy soil.—*T. J. Fitzpatrick*.

1460. NASH, GEORGE V. *Crataegus phaenopyrum*. Addisonia 5: 33. *Pl. 177 (colored)*. 1920.—This hawthorn is a native of southeastern U. S. A. It is highly ornamental because of the abundance of flowers, highly colored fruit, and autumnal coloring of the leaves. It was early cultivated in Europe and to a limited extent in the U. S. A.—*T. J. Fitzpatrick*.

1461. NASH, GEORGE V. *Solidago rugosa*. Addisonia 5:43, 44. Pl. 182 (colored). 1920.—The species is a golden-rod of easy culture, preferring open sunny places, and native of eastern North America.—T. J. Fitzpatrick.

1462. NASH, GEORGE V. *Stephanandra tanakae*. Addisonia 5: 37. Pl. 179 (colored). 1920.—This shrub of the rose family is native of Japan. It is of easy culture and is well adapted to shrub borders or rocky banks.—T. J. Fitzpatrick.

1463. NASH, GEORGE V. *Viburnum sieboldii*. Addisonia 5: 35, 36. Pl. 178 (colored). 1920.—The present species is a shrub or small tree, native of Japan, recently introduced into the U. S. A. It is suitable as a background for small shrubs.—T. J. Fitzpatrick.

1464. PROSCHOWSKY, A. ROBERTSON. Palms of the Riviera. Gard. Chron. 69: 127-128. Fig. 56. 1921.—Next to *Phoenix canariensis*, the so-called California Fan-leaved palm, *Washingtonia filifera*, is the commonest. While introduced to the Riviera less than 40 years ago, it is of such rapid growth that specimens are now found 15 m. or more high and trunk 3 m. in circumference. The plant is briefly described. *Washingtonia robusta*, introduced about 10 years later, grows about twice as rapidly, being the most rapidly growing of all palms for temperate climates. The variety *gracilis* grows less rapidly and has smaller leaves, however of a better green color. *W. filifera* has proved absolutely hardy notwithstanding that on Dec. 17, 1920, the most severe frost known on the Riviera for 100 years or more occurred.—P. L. Ricker.

1465. S., F. L. *Clematis jeuneiana*. Gard. Chron. 69: 159. 1921.—This species is related to *C. armandi*, *C. pavoliniana*, and *C. meyeniana*. It was previously illustrated [Gard. Chron. 69: 135. Fig. 59. 1921] and considered by the author to be a garden hybrid, being exactly intermediate between *C. armandi* and one of the other 2 forms. The name has been accepted by the Royal Horticultural Society. The editors also point out the close resemblance in sound of this name to *C. jouiniiana*. CECIL HANBURY also states that the material is probably a seedling raised at La Mortola from seeds of *C. armandi* sent to his father from western China by E. H. Wilson, which he sent his brother-in-law, Capt. B. H. B. SYMONSJEUNE.—P. L. Ricker.

1466. SMALL, JOHN K. *Grossularia curvata*. Addisonia 5:47, 48. Pl. 184 (colored). 1920.—This gooseberry is a native of Georgia and Alabama. It was discovered near Atlanta, Georgia, in 1905, and has recently been introduced into cultivation.—T. J. Fitzpatrick.

1467. TURBAT, E. Les belles roses nouvelles ou récentes. [Good roses new or recent.] Revue Hort. 92: 156-157. 1920.—The following varieties are specifically noted: Everblooming climbers; Climbing Marquise de Sinety, Climbing Richmond, Climbing Sunburst, each a bud variation of the standard variety of the same name; small-flowered everblooming multiflora climbers, Climbing Orléans rose, Ghislaine de Féligonde, Marie Jeanne; climbing, non-everblooming hybrids of Wichuraiana, Casimir Moullé, Coronation, Paul's Scarlet Climber, Paul Noël, Petit Louis, Source d'Or, Troubadour; climbing, non-everblooming multiflora, Crimson grandiflora, Louis Sauvage, White Merville (White Tausendschön). The name of the introducer, date of introduction, and short description are given for each variety.—E. J. Kraus.

VEGETABLE CULTURE

1468. BUSHNELL, JOHN W. The fertility and fruiting habit in Cucurbita. Proc. Amer. Soc. Hort. Sci. 17: 47-51. 1920 [1921].—Work at the Minnesota Experiment Station during the years 1915-1920 has definitely proved that hubbard squash (*Cucurbita maxima*) is self-fertile. No inherited self-sterility was encountered during the progress of the experiment. In a study of the influence of weather, time of day, and stage of flower development at time of pollination upon set of fruit, it was found that successful pollinations may be made "(1) under a wide range of weather conditions, (2) at any time of day, (3) at any time during the period that the flowers are open." Abortions were numerous in hand-pollinated flowers, but these

could not be correlated with the above factors. Usually the first appearing pistillate flower aborts, then the next flower or flowers are followed by a series of abortions, which in turn are followed by another set. This periodic setting of fruit was also noted in the only open-pollinated plant under observation.—*H. A. Jones.*

1469. LAVENDER, W. The French method of growing asparagus. *Gard. Chron.* 69: 129. 1921.—The ground is first plowed to a depth of 12–14 inches in autumn after thorough dressing with manure. The surface is left rough during the winter. The best results are obtained in sandy loam. In heavy lands, a large quantity of gritty soil should be added. Reliable stock is essential and one of the largest growers never plants roots over 1 year old as they make better growth than older roots. Cutting can begin cautiously the 3rd year after planting, but only 2 or 3 stems are taken from each stool. When the stools are ready for planting, the roots are spread out in a shallow trench and covered with not over 2 inches of rich compost. During the first 2 seasons catch crops are planted between the rows but before the 3rd spring the roots are earthed up with little hillocks 1 foot high. Plants are placed 3–4 feet apart according to soil and amount of manure applied. Fresh manure is not necessary each season, but the largest stalks are secured by good fertilizing. In the vicinity of Paris, road sweepings are applied. If the stalks are preferred green rather than blanched, only a small amount of soil is placed over the stools.—*P. L. Ricker.*

1470. LLOYD, J. W. The effect of "nipping" muskmelon vines. *Proc. Amer. Soc. Hort. Sci.* 17: 126–128. 1920 [1921].—Nipping of the terminal bud of muskmelon vines under field conditions in Illinois was found to be impracticable, both from the standpoint of earliness and total production. In an average of 8 tests the nipped vines produced .99 pounds per hill of early melons and the vines not nipped 1.02. The average total yield from nipped vines was 3.14 pounds per hill while the vines not nipped produced 3.49. The author concludes that earliness and productiveness in muskmelons may better be promoted by liberal fertilizing and careful tillage to encourage vigorous vine growth than by nipping vines to force the formation of laterals.—*H. A. Jones.*

1471. RAPP, C. W. Some important factors in snap bean production. *Proc. Amer. Soc. Hort. Sci.* 17: 116–119. 1920 [1921].—Work at the Oklahoma Agricultural Experiment Station has shown that bacterial blight of snap beans, caused by *Bacterium phaseoli*, can be controlled by planting aged seed on disease-free soil. Infected seed stored for 2 years and planted on disease-free soil produced disease-free plants. The germination average of 4 varieties of snap beans under field conditions after 1, 2, 3, 4, and 5 years' storage was 92, 91, 70.5, 53, and 22 per cent respectively.—*H. A. Jones.*

1472. WELLINGTON, R. Report on vegetable investigations being carried on by experiment stations and similar institutions. *Proc. Amer. Soc. Hort. Sci.* 17: 267–275. 1920 [1921].—A compilation is presented of some of the more important vegetable experiments being conducted in the U. S. A. and Canada. The author has divided the field, grouping projects of similar nature under the same head, as follows: (1) Rotation and fertilizer experiments; (2) soil composting; (3) cultural methods; (4) pruning, training, and suckering; (5) study of plant variations, habits, and adaptations; (6) breeding and selection; (7) pollination studies; (8) use of electricity; (9) cost of production studies; (10) degeneracy of white potatoes and disease studies; (11) storage investigations; and (12) test of varieties.—*H. A. Jones.*

HORTICULTURE PRODUCTS

1473. BENTLEY, C. M. Problems confronting the canning industry. *Monthly Bull. Dept. Agric. California* 9: 643–649. 1920.

1474. CHRISTIE, A. W. Efficiency in dehydration. *Monthly Bull. Dept. Agric. California* 10: 75–82. 1921.—The author treats in detail the various factors concerned in dehydration of fruit and points out the channels for economy in each of the main factors. The preparation of fruit for dehydration,—sulphuring, lye-dipping, etc.,—and the processing and packing of the dried product are fully discussed.—*E. L. Overholser.*

1475. CHRISTIE, A. W. Some observations in the dehydration of apricots, peaches, and grapes. Monthly Bull. Dept. Agric. California 10: 94-95. 1921.—The formation of "air zones" in the tunnel causes lack of uniformity in drying. This can be avoided by increasing the speed of air flow through the tunnel. Screen trays are inadvisable because of the corrosive action of sulphur fumes on the metal.—*E. L. Overholser.*

1476. COLE, W. R. Extension work in horticultural manufactures in Massachusetts. Proc. Amer. Soc. Hort. Sci. 17: 95-98. 1920 [1921].

1477. CRUESS, W. V. Observations in the evaporation of pears, prunes and figs. Monthly Bull. Dept. Agric. California 10: 88-93. 1921.—Locality is a factor in the suitability of pears for evaporation only in so far as it causes a difference in the sugar content of the fruit. The fruit of highest sugar content yields dried products best in color, texture, and flavor. The control of temperature and relative humidity is important, especially in the case of pears. There is no noticeable difference in the yield of dried product from sun drying and evaporation.—*E. L. Overholser.*

1478. DAVIES, S. M. Loss of citric acid in limes and lime juice. Agric. News [Barbados] 20: 75. 1921.—The author made tests with sets of 50 limes of various degrees of ripeness to determine the loss of citric acid in rotten fruit. The limes were hand-pressed, the juice of each set measured and acidity determined. Calculated in terms of citric acid per barrel, the results were as follows: Ripe yellow limes, 5.3 pounds, yellow green limes 4.9, overripe limes 4.6, green limes 4.4, and mushy rotten limes 1.7. To determine the losses of citric acid on storing lime juice, 200 pounds, fresh from the mill and stored in a half tub to a depth of 11-12 inches, were allowed to stand under cover; the scum was not disturbed except in lifting the tub on and off a scale at frequent intervals. After 19 days the juice had lost 16 pounds by evaporation and the acid was reduced from 12.1 to 11.3 ounces equivalent to 10.4 ounces of the original volume. This represents a loss of 1.7 ounces of citric acid per gallon, or 14 per cent of the original acid content. The scum showed a thick layer of *Saccharomyces mycoderma*,—an active reducer of citric acid,—accompanied by a considerable growth of bacteria.—*J. S. Dash.*

1479. JONES, B. J. A successful co-operative evaporating plant. Monthly Bull. Dept. Agric. California 10: 82-85. 1921.—Certain details in pre-treatment of fruit for dehydration to secure attractive products are mentioned, as, for instance, a certain amount of peeling is essential to prevent the "curling" of the fruit.—*E. L. Overholser.*

1480. SWETT, F. T. Relation of fruit by-products to horticulture. Monthly Bull. Dept. Agric. California 10: 66-70. 1921.—The author reviews the field of possibilities of fruit products in California, and lays stress on the economic importance of solving the several problems confronting the farmer and manufacturer of to-day.—*E. L. Overholser.*

MORPHOLOGY, ANATOMY, AND HISTOLOGY OF VASCULAR PLANTS

E. W. SINNOTT, *Editor*

(See also in this issue Entries 1133, 1181, 1208, 1256, 1258, 1331, 1385, 1386, 1414, 1552)

1481. ANONYMOUS. A plant that feeds on animals. Sci. Amer. Monthly 3: 218. Fig. 1-3. 1921.—A description is given of the mechanism of the bladders of *Utricularia vulgaris*.—*Chas. H. Otis.*

1482. BOUYGUES, H. Considerations sur l'endoderme. [Considerations on the endodermis.] Compt. Rend. Acad. Sci. Paris 172: 332-335. 1921.—Petioles, rhizomes, stems, and leaf veins were studied. The author concludes that the endodermis cannot be considered as a constant anatomical feature delimiting the cortex from the fibro-vascular system.—*C. H. Farr.*

1483. BRADLEY, CORNELIUS BEACH. The phyllotaxy of *Phoenix canariensis*. Torreyia 21: 37-44. Pl. 1-2, 1 chart. 1921.—A study of ornamental specimens of *Phoenix canariensis* grown in and about Berkeley, California, shows that the leaf arrangement is not of a single and stable pattern. Each tree has passed through several distinct phases of phyllotaxy. Three zones representing regular patterns, the 5-, 13-, and 34-ranked, are recognized, and the intervals between are occupied by 2 groupings not belonging to any of the ordinary alignments. The interfoliar arc is gradually changed so as to build up these transitional formations, causing the vertical ranks to swerve in the direction of the primary spiral. This rotation of the pattern is continued until some one of the secondary ranks becomes vertical, after which another regular pattern begins. The chart illustrates the sequence of patterns in the 5 phyllotactic zones.—J. C. Nelson.

1484. BRIQUET, J. La structure foliaire des *Hypericum* à feuilles scleromarginées. [Foliar structure of *Hypericum* species having leaves with indurated margins.] Compt. Rend. Soc. Phys. et Hist. Nat. Genève 36: 75-79. 1919.—In certain species of *Hypericum*, the leaves are reinforced along their margins by a thickening that unites with the veins in a way suggesting that it constitutes a portion of the fibro-vascular system. Three species, *H. pimelaecoides* Pl. and Lind, *H. cordiforme* St. Nil, and *H. connatum* Lamk. were studied to determine whether such a condition actually occurred. The thickenings were found to be composed in some cases of an exaggerated development of epidermal covering; in other cases, of greater development of collenchyma. The function appears to consist in permitting the leaf to retain its form during periods of intense transpiration and to resist tearing.—Charles Drechsler.

1485. BRIQUET, J. Les trichomes foliaires des *Centaureas* Phrygiées. [The foliar trichomes of species of *Centaurea*.] Compt. Rend. Soc. Phys. et Hist. Nat. Genève 36: 96-102. 1919.—The hairs of *Centaurea* spp. consist of 2 parts; the foot, composed of 2 or more relatively broad cells, and the flagellum, composed of a single elongated slender cell, the contents of which dies soon after its development. The flagellum is often early caducous, leading to a variety of conditions described as harsh, hirsute, etc., although where it remains attached a tomentose condition obtains. The shedding of the flagellum is related to a fold along its base. Trichomes are described in detail for *C. procumbens* Balb., *C. Jordaniana* Godr. and Grev., *C. pectinata* L., *C. uniflora*, *C. phrygia* L. emend., *C. rhaetica* Moritzi, *C. trichocephala*, *C. hyssopifolia* Vahl., *C. linifolia* Vahl., and *C. antennata* Duf. In general, 3 types may be distinguished, 1 with a cylindrical foot, a 2nd with a conical foot, and a 3rd with the foot irregular. From an ecological standpoint the trichomes serve to reduce evaporation while the leaf is young by surrounding the leaf in a dead air space confined within the cottony or tomentose layer formed by the flagella.—Charles Drechsler.

1486. CAMPBELL, DOUGLAS HOUGHTON. The gametophyte and embryo of *Botrychium obliquum* Muhl. Ann. Botany 35: 141-158. Pl. 7, 11 fig. 1921.—The gametophyte of *Botrychium obliquum* is similar to those of other species of the genus. The embryo, however, differs in several important respects from those of the other 2 species, *B. Lunaria* and *B. virginianum*, which have been studied and which with *B. obliquum* represent the 3 types of adult sporophytes found in the genus. It differs in the endogenous origin of the root, in the bipolar arrangement of cotyledon and root, and especially in the presence of a suspensor. The embryo is in fact much more like those of some species of *Ophioglossum* and *Danaea* than it is like those of other species of *Botrychium*. It has previously been shown that the embryos of *B. Lunaria* and *B. virginianum* are very different from each other. The author believes that if further investigation shows that other species of the Ternatum group agree with *B. obliquum* in regard to the embryo, there is ample reason for separating off this section as a new genus, and also that *B. virginianum* differs sufficiently from the other species to deserve generic rank. The present genus would thus be divided into 3. The development of the embryo, including the apical regions of stem, cotyledon, and root, as well as the vascular system, is worked out in detail.—W. P. Thompson.

1487. COLLINS, MARJORIE I. On the structure of the resin-secreting glands in some Australian plants. Proc. Linn. Soc. New South Wales 45: 329-336. Fig. 1-12. 1920.—A descrip-

tion is given of the occurrence and development of glandular hairs in *Dodonaea viscosa* Linn., *Acacia rupicola* F. v. M., *A. armata* R. Br., *A. pycnantha* Benth., *A. verniciflua* Cunn., *Ixodea achilleoides* R. Br., *Helichrysum semipapposum* De Cand., *Humea cassiniacea* F. v. M., *Myoporum serratum* var. *insulare* R. Br., *Myoporum serratum* var. *viscosum* R. Br., and *Eremophila latifolia* F. v. M. The facts observed throw light upon the structure of the mature gland and are of systematic value.—*Eloise Gerry.*

1488. FLETCHER, J. J. Presidential address. Proc. Linn. Soc. New South Wales 45: 1-47. Pl. 1-8. 1920.—On pages 24-47 the author discusses The Correct Interpretation of the So-called Phyllodes of the Australian Phyllodineous Acacias. It is suggested that the Australian phyllodineous Acacias should be distinguished from ordinary "phyllodes," (phyllodium = "a petiole usurping the form and function of a leaf-blade," Gray), although this definition was originally intended to apply to the flattened leaf-substitutes of these plants. In the Acacias these structures are neither cladodes nor phylloclades as these terms are currently defined. The author, having determined this, proposes the name Euphyllodineae since the so-called euphyllodes of the Australian Acacias are more than simply flattened petioles. Rather they are considered vertically flattened primary leaf axes or common petioles, with pinnae suppressed, which have usurped the form and function of leaves. The leaf development is traced through the seedling stages, species are compared and illustrated, and analogies with other existing bipinnate species discussed. The incorrectness of current ideas about phyllodes is due to: (1) Neglect to determine the mode of succession of the pairs of pinnae in the development of the bipinnate leaves; (2) non-recognition or disregard of the meaning and significance of the presence of Bentham's "seta terminalis" or "recurved or excurrent point" of the common petiole or of its distal component, the rhachis, due recognition of which, especially in seedlings with only 1 pair of pinnae, is the key to the understanding of the euphyllodia; (3) failure to take into account the fact that the petioles or apparent petioles of known Australian bipinnate Acacias are short relative to the length of the entire primary leaf-axes or common petioles whereas the so-called phyllodes are longer than the petioles. Reversion-foliage, its characteristics and its absence in several species, is discussed and figured.—*Eloise Gerry.*

1489. HOCHREUTNER, B. P. G. Le carpocratère, un nouvel organe du fruit des Malvacées. [The carpocrater, a new organ of the fruit of Malvaceae.] Compt. Rend. Soc. Phys. et Hist. Nat. Genève 36: 80-81. 1919.—The author found in all species of *Cristaria* a cup-like structure at the base of the fruit, the function of which seems to be first protective, and then to facilitate the dissemination of the seed. This structure, which has not been mentioned before, is designated as a *Carpocrater*.—*Charles Drechsler.*

1490. HOLMES, M. G. A contribution to the study of water-conductivity in sycamore wood. Ann. Botany 35: 251-268. 13 fig. 1921.—This paper is a continuation of studies [see Bot. Absts. 3, Entry 1109] on the constitution of the wood of shoots of various species in relation to their efficiency in the conduction of water and deals with the sycamore (*Acer pseudoplatanus*). The wood of the 1st year shows a general similarity to those previously studied. The area of the wood in transverse section, the water conducting area in this wood, and the total number of water conducting elements all show, as in previous cases, a simple decline from base to apex. The specific conductivity rises and then falls, and its value is in general near that of hazel and higher than that of ash. The author made observations also on 2nd and later annual rings finding less variation in specific conductivity than in 1st year wood; also the specific conductivity is somewhat lower in value because the vessels are less abundant though wider.—*W. P. Thompson.*

1491. JEFFREY, EDWARD CHARLES, AND RAY ETHAN TORREY. Transitional herbaceous dicotyledons. Ann. Botany 35: 227-250. Pl. 11-13, 5 fig. 1921.—BAILEY and SINNOTT have criticized the theory that the herbaceous type in dicotyledons has been evolved from the arboreal type by the formation of large rays in relation to the entering leaf-traces, maintaining that it was in large part merely the result of the progressive thinning of the vascular cylinder. The present article is in reply to their criticisms, contradicting many of their statements of

fact as well as their conclusions and supporting the original theory. Special care is taken to advance evidence that the large rays in many herbs are subtended by leaf-trace bundles since a statement that this condition is rarely found constituted the chief criticism of the theory. A comparison in regard to ray conditions is made between nearly related trees and herbs in a wide variety of natural groups, including Malvales, Urticales, Ranales, Leguminosae, Scrophulariaceae, and Compositae. From the facts brought out it is concluded that a practically never-failing distinction between trees and the aerial axes of woody herbs is the formation in the latter of large rays about the incoming leaf-traces, these rays being well-developed radially but only slightly extended vertically. In less woody herbs the foliar rays become reduced radially because of the thinning of the woody cylinder but at the same time become elongated vertically. The vertical extension results in the division of the cylinder into a series of separate strands. Finally, in the extreme herbaceous condition the woody cylinder is thinned to such a degree that the radial extension of the foliar rays is eliminated. This condition is associated with a great development of those portions of the ray on each side of the leaf-trace.—W. P. Thompson.

1492. MAILLEFER, ARTHUR. Les mouvements hygroscopiques des rameaux de l'ombelle de *Daucus Carota* L. [Hygroscopic movement in the branches of the umbel of *Daucus Carota*.] Bull. Soc. Vaudoise Sci. Nat. 52: 385-394. Fig. 1-10. 1919.—The hygroscopic effect, as manifested in bending, was found to be greater in the distal than in the proximal half of the branches of the umbel. In the proximal portion the vascular system is represented by numerous fibrovascular bundles of highly lignified, obliquely pitted elements, the bundles united into a cylindrical structure by masses of fibers with little dorsiventral differentiation. The distal part is dorsiventral in structure. On the upper adaxial side is an arch of 4 vascular bundles, the 2 uppermost obliquely pitted, the 2 lateral ones transversely. As the latter are capable of greater elongation, a mechanical differentiation is brought about between lateral and uppermost bundles, which causes the movements observed. The bundle on the lower side tends to oppose movement, but is not large enough to prevent it. By observing the action of longitudinal sectors of branches, the author obtained evidence that KLEINS' view (that movement is due to difference in activity between abaxial and adaxial bundles) is erroneous. There is a marked degree of dorsiventral differentiation with respect to presence of sclerenchyma. MARTEL is wrong in assigning a major mechanical rôle to this, however, although it may be effective in the nyctitropic movements occurring before the ripening of the fruit.—Charles Drechsler.

1493. MAILLEFER, ARTHUR. Sur le développement de la structure anatomique de la tige d'*Impatiens Roylei* Walpers. [Development of the anatomical structure of the stem of *Impatiens Roylei* Walpers.] Bull. Soc. Vaudoise Sci. Nat. 52: 237-274. Fig. 1-27. 1919.—The young hypocotyl of this species shows 4 strands of protoxylem between each 2 of which may be distinguished 2 groups of phloem elements. The epidermis, a single layer of cells, overlies a layer of collenchyma cells which is separated from the endodermis by a thick cortex. Metaxylem cells begin to appear on the inner side of the protoxylem groups, which gradually disappear. The phloem now increases in mass and the cambium begins to appear and forms secondary wood near the lateral edges of the primary wood. A cavity results from the degeneration of the central portion of the pith. The secondary wood cells gradually assume isolated positions toward the center of the stem. The mature hypocotyl shows a layer several cells thick immediately inside the endodermis, the pseudopericycle. The cambium ceases to function after forming a considerable layer of fibers and vessels. Secondary parenchyma rays are present, distinct from medullary rays and having no relation to the pith.—The development of the stem is followed in the same way. In mid-summer a longitudinal section shows the tissues in the following order: Epidermis, dermal collenchyma, cortical cells, endodermis, phloem, cambium, pitted vessels, woody fibers, collenchymatous woody parenchyma, scalariform vessels, spiral vessels, and pith. Short sections are devoted to the structure of the phloem, the course of the vessels, the structure of adventitious roots, and the distribution of anthocyan in the epidermis.—Charles Drechsler.

1494. MOLLIARD, M. Sur des phénomènes tératologiques survenant dans l'appareil floral de la Carotte à la suite de traumatismes. [Teratological phenomena resulting from wounding the inflorescence of the carrot.] Compt. Rend. Acad. Sci. Paris 172: 473-475. 1921.—The author reports a study of the wounding effects of grazing cattle upon the form and structure of the inflorescence of the carrot. Double flowers are reported, some that were almost without petals, and still others with neither stamens nor petals.—C. H. Farr.

1495. PURVIS, O. N. The effect of potassium salts on the anatomy of *Dactylis glomerata*. Jour. Agric. Sci. 9: 338-365. 23 fig. 1919.—Thickness of walls, diameter of lumina, and the ratio of lumen to wall were measured both in sclerenchyma and metaxylem elements of stems of *D. glomerata* grown on plots receiving different manurial treatments as regards potash. Where potash was supplied the sclerenchyma walls were thinner in early stages, but this effect was lost as the season progressed. Under the same conditions the lumina were larger than normal; but in the presence of ammonium salts this effect was reversed. The thickness of walls in the xylem was unaltered whether potassium was added or not, but the diameter of the lumen was reduced in the presence of potash. In the latter case the addition of ammonium salts with potash resulted in an increase in diameter.—The addition of potassium salts gave an increased ratio of lumen to wall, but the effect gradually disappeared. It is concluded that fertilization with potassic fertilizers reduces the strength of mechanical cells in the early stages of growth unless, indeed, the salts affect the composition of the wall. The rigidity of plants supplied with potassium salts is not the result of anatomical strengthening but must be attributed to other causes, such as the effect of the salts on the physiological condition of the plants.—D. Reddick.

1496. RUSBY, H. H. A strange fruit. *Torreya* 21: 47-50. 1 fig. 1921.—A description is given of the Mexican *Jarilla Sesseana* (Ramirez) Rusby. The fruit seems reversed in form, the thickened and elongated style simulating a peduncle, and the 5 fleshy curved appendages at the base resembling calyx lobes. The author regards this form as specifically distinct from *J. heterophylla*.—J. C. Nelson.

1497. SAHNI, B. Note on the presence of a 'tent-pole' in the seed of *Cephalotaxus pedunculata*. Ann. Botany 35: 297-298. 2 fig. 1921.—The seed of *Cephalotaxus pedunculata* shows a small apical prolongation of the female prothallus which props up the nucellar membrane somewhat after the fashion of a tent-pole. This is a strong Cordaitalean characteristic and the similarity is mentioned as additional evidence in support of the Cordaitalean affinity of the Taxales.—W. P. Thompson.

1498. SEELIGER, RUDOLF. Die Abstosung der primären Rinde und die Ausheilung des Wurzelbrandes bei der Zuckerrübe (*Beta vulgaris* L. var. *rapa* Dum.). [Sloughing of the primary cortex and healing of root canker in the sugar beet.] Arbeit. Biol. Reichsanstalt Land- u. Forstw. 10: 141-148. Pl. 1, 3 fig. 1919.—In the absence of parasitic fungi no discoloration is produced in the cortex tissue at the time of the sloughing of the primary cortex; and the remains of such tissue on the hypocotyl are uncolored. When parasitic fungi are present the sloughing of the primary cortex is always accompanied by a greenish-brown, brown, or blackish-brown coloration of the infected tissue, but it is not possible to determine the degree of infection from the degree of color produced. Healing takes place unless the infection has passed beyond the tissue which is cast off. RÜGGEBERG's investigations of this same problem were carried on with plants grown in water cultures. Parasitic fungi present in the water cultures caused the discolorations reported by this author and his conclusions are not, therefore, descriptive of the normal conditions.—Reginald H. Colley.

1499. SEELIGER, RUDOLF. Untersuchungen über das Dickenwachstum der Zuckerrübe (*Beta vulgaris* L. var. *rapa* Dum.). [Investigations on the growth in thickness of the sugar beet.] Arbeit. Biol. Reichsanstalt Land- u. Forstw. 10: 149-194. Pl. 2, 21 fig. 1919.—The author investigated the morphology of the sugar beet from the seedling stage through 1 year's growth, and finds that the primary epidermis is soon divided off from the fundamental tissue of the root

and hypocotyl, that the annular and spiral vessels of the primary wood are cut off from functioning, and that the sieve tubes and companion cells are obliterated; but the pericycle, the metaxylem, and the parenchyma cells of the primary wood, and the parenchyma cells of the primary bast retain their functions. The normal circle of vascular bundles arises from a row of cells in the central cylinder. The primary medullary rays are formed by cells from the pericycle. The extra-fascicular vascular bundle circle arises from a meristem originating either in the pericycle or in the parenchyma of the primary bast. In the hypocotyl the fascicular meristem in the pith develops from the pericycle, whereas that outside the pith develops either from the pericycle or the parenchyma of the primary bast. In the root the fascicular meristem usually develops from the parenchyma of the primary bast. Storage tissue develops from parenchyma cells of the bast of the vascular rings and from medullary ray tissue. The outer cells of the pericycle develop into a phellogen several layers thick.—*Reginald H. Colley.*

1500. SOUÈGES, RENÉ. Embryogénie des Scrophulariacées. Développement de l'embryon chez le *Veronica arvensis*. [Embryogeny of the Scrophulariaceae. The development of the embryo of *Veronica arvensis*.] Compt. Rend. Acad. Sci. Paris 172: 703-705. Fig. 1-17. 1921.—The stages of development of the embryo of *Veronica arvensis* are described. They are found to be quite similar to those of *Oenothera* and the Cruciferae.—*C. H. Farr.*

1501. VUILLEMIN, PAUL. La zygomorphose endogène dans les fleurs normalement actinomorphes. [Endogenous zygomorphosis of flowers which are normally actinomorphic.] Compt. Rend. Acad. Sci. Paris 172: 428-431. 1921.—The types and examples are given of modifications of normally actinomorphic flowers into zygomorphic ones. Modifications of position of 2 types are described, namely, radial and circular displacement. Two types of modification of configuration are also defined, namely, homologous substitution and disproportion. Modification in number may be either discordant oscillation, abortion with addition of supplementary members, or the development of complementary members.—*C. H. Farr.*

1502. VUILLEMIN, PAUL. La zygomorphose exogène dans les fleurs normalement actinomorphes. [Exogenous zygomorphosis of flowers which are normally actinomorphic.] Compt. Rend. Acad. Sci. Paris 172: 514-517. 1921.—Types and examples of exogenous zygomorphosis are given. The 3 main types distinguished are synanthic and parasynanthic zygomorphosis and zygomorphosis at a vegetative junction.—*C. H. Farr.*

MORPHOLOGY AND TAXONOMY OF ALGAE

E. N. TRANSEAU, *Editor*

(See in this issue Entries 1503, 1674)

MORPHOLOGY AND TAXONOMY OF BRYOPHYTES

ALEXANDER W. EVANS, *Editor*

1503. BOULGER, G. S. The cryptogams of Andrews' Herbarium. Jour. Botany 57: 337-340. 1919.—This list is supplementary to a list of phanerogams. Notes are presented on 1 fern, 12 mosses, 6 hepatics, 21 algae, 4 lichens, and 7 fungi.—*K. M. Wiegand.*

1504. EVANS, ALEXANDER W. *Taxilejeunea pterogonia* and certain allied species. Bull. Torrey Bot. Club 48: 107-136. Pl. 2, 22 fig. 1921.—The following species, which represent a clearly defined group, are treated: *Taxilejeunea pterogonia* (Lehm. & Lindenb.) Schiffn., widely distributed in tropical America; *T. jamaicensis* sp. nov., known only from Jamaica; *T. densiflora* sp. nov., known only from Jamaica and Colombia; and *T. debilis* (Lehm. & Lindenb.) Steph., widely distributed in tropical America.—*P. A. Munz.*

1505. HOLZINGER, J. M., AND T. C. FRYE. Mosses of the Bureau of Soils Kelp Expedition to Alaska. Publ. Puget Sound Biol. Sta. 3: 23-64. 32 fig. 1921.—A list is given of the mosses

collected by the Kelp Expedition in 1913, together with other unreported Alaskan species sent from time to time to the University of Washington. The species enumerated number 198 and the varieties 25. *Camptothecium paulianum* Grout from St. Paul Island and *Hypnum tananae* Grout from Tanana are described as new species, and *Aulacomnium androgynum pygmaeum* from Mitrofanina Bay as a new variety. The following new combinations are likewise proposed: *Brachythecium pacificum* (Ren. & Card.) Grout, based on *B. reflexum pacificum* Ren. & Card.; and *Trachycystis pellucida* (Williams), based on *Bryobrittonia pellucida* Williams. The list includes 44 species and 11 varieties of mosses reported for the first time from Alaska. Two of the species, *Geheebia gigantea* (Funck) Boulay and *Zygodon reinwardti* (Hornsch.) Al. Braun, represent additions to the North American flora. Critical notes are interspersed throughout the article, and the recognition of the genera *Geheebia* and *Trachycystis* is suggested. The figures, arranged on 4 plates, were drawn by E. B. CHAMBERLAIN and represent *Bryobrittonia pellucida*, *Dicranella squarrosa* (Schrad.) Schimp., and *Trachycystis flagellaris* (Sull. & Lesq.) Lindb.—T. C. Frye.

1506. LUISIER, A. Fragments de bryologie ibérique. [Notes on Iberian bryology.] Broteria Ser. Bot. 19: 5-11. 1921.—The 1st part of the article catalogues a collection of mosses made at Ofia in the province of Burgos; *Campylium Sommerfeldtii* (Myr.) Bryhn is reported for the first time from Spain, and a supplementary list indicates the species previously known from the province. The 2nd portion of the article deals with the distribution on the Iberian peninsula of *Triquetrella arapilensis* Luis., *Brachymenium lusitanicum* (Luis.) Hagen, and *Cladopodium Whippleanum* Sull.—E. B. Chamberlain.

1507. LUISIER, A. Les mousses de Madère. [Mosses of Madeira.] Broteria Ser. Bot. 19: 36-48. 1921.—The present installment of this series [see Bot. Absts. 7, Entry 351] comprises the keys to the 1st part of the Pottiaceae.—E. B. Chamberlain.

1508. MEYLAN, CH. Note sur une nouvelle espèce de mousse. [On a new species of moss.] Bull. Soc. Vaudoise Sci. Nat. 52: 383-384. 1919.—A new species, *Desmatodon Wilczekii*, collected at an altitude of 2600 m., is described. It represents a form intermediate between *Desmatodon* and *Pottia*, resembling the former genus in its gametophyte and the latter in its capsule. The spores measure 25-35 μ and are minutely papillate. Maturing in August, the operculum remains attached to the summit of the columella as in the genus *Hymenostylium*; no peristome is present.—Charles Drechsler.

MORPHOLOGY AND TAXONOMY OF FUNGI, LICHENS, BACTERIA, AND MYXOMYCETES

H. M. FITZPATRICK, *Editor*

(See also in this issue Entries 1308, 1309, 1318, 1323, and others in the section Pathology)

FUNGI

1509. BIJL, PAUL A. VAN DER. Note on *Lysurus Woodii* (MacOwan) Lloyd. Trans. Roy. Soc. South Africa 9: 191-193. Pl. 11. 1921.—The nomenclature of *Lysurus Woodii* and its relation to other species of the genus are discussed.—E. M. Doidge.

1510. BIJL, PAUL A. VAN DER. South African *Xylarias* occurring around Durban, Natal. Trans. Roy. Soc. South Africa 9: 181-183. Pl. 7-8. 1921.—Four species of *Xylaria* occur in the neighborhood of Durban, namely *Xylaria multiplex*, *X. apiculata*, *X. anisopleura*, and *X. polymorpha*. Three of these have not been previously recorded from South Africa.—E. M. Doidge.

1511. BIJL, PAUL A. VAN DER. The genus *Tulostoma* in South Africa. Trans. Roy. Soc. South Africa 9: 185-186. Pl. 9. 1921.—Two species of this genus are mentioned as occurring in South Africa, *Tulostoma cyclophorum* and *T. Lesliei*, the latter being described as a new species.—E. M. Doidge.

1512. BURLINGHAM, GERTRUDE S. Some new species of *Russula*. Mycologia 13: 129-134. Pl. 7 (colored), fig. 1-6. 1921.—Six new species are described and illustrated in colors.—H. R. Rosen.

1513. COLLINS, MARJORIE I. Note on certain variations of the sporocyst in a species of *Saprolegnia*. Proc. Linn. Soc. New South Wales 45: 277-284. Fig. 1-11. 1920.—Certain variations in sporocyst formation and discharge are recorded for an undetermined species of *Saprolegnia* growing under both natural and cultural conditions. *Leptolegnia*, *Pythiopsis*, and *Achlya* conditions occurred rarely, *Dictyuchus* and *Aplanes* conditions frequently. These variations occurred in both club-shaped and cylindric sporocysts but were not observed arising from resting sporocysts. The *Dictyuchus* condition differs from both of those described by LECHMERE and is held to be the true *Dictyuchus* condition. Composite sporocysts were observed; the most important combine the features of *Dictyuchus* and *Aplanes* (*Dictyuplanes*). Evidence is given in favor of the suggestion that the *Aplanes* condition has arisen from the *Dictyuchus* by failure of the protoplast to escape from the germ tube during its early growth. New sporocysts are frequently formed as lateral, basal branches of old sporocysts, owing to the blocking of the latter with empty cyst cases and germinating spores.—Eloise Gerry.

1514. COOL, CATH. Het paddenstoeljaar 1920. [The toadstool year 1920.] Levende Natuur 25: 292-298. Fig. 5. 1921.—The occurrence of higher fungi in various parts of the Netherlands during 1920 is reported.—J. C. Th. Uphof.

1515. CURTIS, K. M. The life-history and cytology of *Synchytrium endobioticum* (Schilb.) Perc., the cause of wart disease in potato. Phil. Trans. Roy. Soc. London B 210: 409-473. Pl. 12-16. 1921.—Two forms of reproductive bodies are formed in *Synchytrium endobioticum*, the resting sporangium and the sorus. Zoospores are liberated from the resting sporangium and, after a short period of activity, can infect young tissue of the potato plant. The zoospore penetrates the surface wall of an epidermal cell, a nuclear projection preceding the entrance of the body. It then passes to the lower end of the cell, enlarges and becomes differentiated into nucleus, cytoplasm, and outer membrane. This body is termed the prosorus. A process of repeated nucleolar discharge sets in; chromatin and linin are given off into the nuclear cavity; the chromatin is dissolved, the linin fills the cavity. The prophase of primary mitosis begins after the 3rd discharge. Five delicate strands distinct from the linin mass extend from the nucleolus to the opposite side of the cavity. The prosorus is invested by a thick outer and delicate inner membrane. The host cell enlarges and dies. The cytoplasm and nucleus of the prosorus pass through a pore in the membrane outward into the host cell. Repeated mitosis takes place in the nucleus during and following emergence. The 5 minute spherical chromosomes are believed to originate from a globule given off by the nucleolus. The spindle is intranuclear and the membrane persists until metaphase; centrosomes and asters are absent. After about 5 mitoses the prosorus segments into 4-9 sporangia, the walls of which arise by deposition of cleavage membranes independently of the nuclei. The sporangia remain inclosed within the common membrane. Nuclear divisions occur until 200-300 nuclei are formed in each sporangium. On absorption of water, areas are delineated by intersecting strands of protoplasm and vacuoles which become the zoospores. A blepharoplast lies on the periphery of each area and is connected on the one hand with nucleus and on the other with an adjacent zoospore by deeply staining strands; the latter become cilia. Repeated divisions of underlying host cells elevate the sorus, and division of adjacent epidermal cells produces a rosette surrounding the infected cell. The pressure due to the enlarging sporangia and the swelling of underlying cells ruptures the host cell and soral membrane and frees the sporangia. These in turn rupture at hyaline projections and liberate uniciliate motile cells which seem to be

facultative gametes. Their fusion in pairs was observed and the further development of both the unpaired zoospore and the zygote was followed in detail. Temperature is not the factor determining the sexual or asexual nature of the motile cells of the sorus, but it is believed that when water is withheld after the formation of the zoospores so that a maturation period intervenes prior to their discharge, the simultaneous discharge from several sporangia upon the renewal of a water supply causes the motile cells to act as gametes. It is believed that gametes fuse only with those of another sporangium. The soral zoospores are smaller than those produced by the resting sporangium but are otherwise similar; penetration by both kinds of zoospores and by the zygote is essentially the same. Either type of zoospore gives rise to a prosorus but the zygote produces a resting sporangium. The development of the latter resembles that of the sorus in the earlier stages; the substance of the nucleolus is repeatedly given off into the nuclear vacuole, the chromatin disappears, and a mass of linin remains. Subsequently chromatic granules appear in the cytoplasm; these become differentiated into chromatic and achromatic parts and are the primordia of zoospores. A reduction process is believed to supervene when all the chromatic material of the primordium except a single granule is given off into the cytoplasm; from this granule the nucleus of the zoospore is formed. A blepharoplast upon which the cilium is later inserted is connected with the nucleus by a strand. Mitotic divisions characteristic of the developing sorus are absent in the resting sporangium, and despite the sexual origin of these bodies clear evidence of reduction in their development is wanting. When more than 1 zygote penetrates a host cell the supernumerary cysts are distributed by mitotic divisions of the host cell. In this way resting sporangia come to lie several layers deep in the host tissue. The resting sporangium has a 3-layered membrane; the 2 inner ones are derived from the parasite, the outer from the disorganizing host cell. Rupture of the membrane results from swelling of the innermost layer in a conical internal projection. This species is precisely described by SCHÖTER's diagnosis of the division *Mesochytrium* of the genus *Pycnochytrium*, but the author prefers to retain FISCHER's generic name *Synchytrium*. Earlier references to the occurrence of giant zoospores with 2 cilia in this group are confirmed by the present study and interpreted as resulting from sexual fusions. The demonstration of the existence of sexuality in all Synchytriaceae which produce true resting sporangia is predicted.—F. Weiss.

1516. DOIDGE, ETHEL M. South African Ascomycetes in the National Herbarium. Bothalia 1: 5-32. Fig. 1-5. 1921.—Fifty ascomycetes are described including the four new genera *MacOwaniella*, *Isipinga*, and *Palawaniella* belonging to the Polystomellaceae, and *Parastigmatea* of the family Stigmateaceae. Descriptions are given of the following new species: *Cycloshizon fimbriatum*, *Cocconia capensis*, *Polyrhizon Bewsii*, *Isipinga areolata*, *Elmerococcum Peglerae*, *Rosenscheldia horridula*, *Parastigmatea nervisita*, *Phragmodothella nervisequen*, *Catacauma Peglerae*, *Scolecodothis capensis*, *Phyllachora Lessertiae*, *Phyllachorella rikatiensis*, *Endodothella natalensis*.—E. M. Doidge.

1517. DOIDGE, ETHEL M. South African Perisporiaceae. VI. The haustoria of the genera *Meliola* and *Irene*. Trans. Roy. Soc. South Africa 9: 117-127. 7 fig. 1921.—The haustoria of several species are examined; the most common type is that which has a fine filament penetrating the cuticle and a small, globular, thin-walled, uninucleate vesicle in the epidermal cell. The nature of the penetrating filament appears to be specific in character and not correlated with the thickness of the cuticle traversed. Certain species penetrate into the first chlorophyll-containing cells of the mesophyll. The character of the penetrating filament is of diagnostic value and may, in some cases, be employed as a determining factor when there is any question of the identity of 2 species.—E. M. Doidge.

1518. DURAND, ELIAS J. New or noteworthy Geoglossaceae. Mycologia 13: 184-187. 1921.—The author clarifies several species previously described and gives technical descriptions of *Trichoglossum confusum* n. sp. and *T. Wrightii* n. sp., the latter raised to specific rank from *T. hirsutum* forma *Wrightii* Durand.—H. R. Rosen.

1519. ELLIS, DAVID. Advances in the study of yeasts. [Rev. of: GUILLIERMOND, A. The yeasts. Translated and thoroughly revised in collaboration with the original author by F.W. TANNER. xix + 424 p. John Wiley and Sons: New York; Chapman and Hall: London, 1920.] (See Bot. Absts. 8, Entry 2057.) Nature 107: 387-388. 1921.

1520. FINK, BRUCE. Notes on the powdery mildews of Ohio. Ohio Jour. Sci. 21: 211-216. Fig. 1-2. 1921.—The article discusses 22 species of Erysipheae, giving localities, hosts, and species not previously reported from Ohio.—H. D. Hooker, Jr.

1521. FOËX, ETIENNE. Liste des champignons récoltés dans le canton de Vaud et principalement à Saint-Cergue pendant l'été 1918. [List of fungi collected in the canton of Vaud, especially near Saint-Cergue during the summer of 1918.] Bull. Soc. Vaudoise Sci. Nat. 52: 457-460. 1919.—The author mentions 59 different species of fungi and the hosts upon which they were collected.—Charles Drechsler.

1522. FOËX, ETIENNE. Note sur un Cordyceps. [On a species of Cordyceps.] Bull. Soc. Vaudoise Sci. Nat. 52: 461-464. Pl. 1, fig. 1. 1919.—The author describes and figures a specimen of *Cordyceps*, not altogether intact, collected in the Forest of the Jorat, that is probably to be referred to *Cordyceps capitata* (Holm.) Link, in spite of some variations from the description of this form. An interesting characteristic of the fungus is found in the filamentous ascospores becoming septate toward maturity, the segments later becoming disarticulated. The discharge of the ascus is accomplished by the ascus wall becoming gelatinous from the base upward, releasing the spore segments, often in a manner permitting the original linear arrangement of the latter to be perceived.—Charles Drechsler.

1523. GIBBS, L. S. Notes on the phytogeography and flora of the mountain summit plateau of Tasmania. Jour. Ecol. 8: 89-117. 1920.—A species of *Morchella*, collected in a Eucalyptus forest on Mt. Dromedary at an elevation of 3000 feet, is described under the name *M. tasmanica* J. Ramsbottom.—Geo. D. Fuller.

1524. HÖHNEL, FRANZ VON. Fungi Imperfecti: Beiträge zur Kenntnis derselben. [Contributions to our knowledge of the Fungi Imperfecti.] Hedwigia 60: 129-208. 1918; 60: 209. 1919.—*Phoma occulta* Desmazières is a typical *Sclerophomella*, closely related to *S. verbascicola* (Schw.) v. H., and is named *S. occulta* (Desm.) v. H. It is the conidial stage of a *Pleospora*, probably *P. vagans* Niessel or *P. infectoria* Fekl. *Sphaeria leptidea* Fr. is not, as stated by VLEUGEL, the conidial stage of *Lophodermium melaleucum* (Fr.) de Not., nor is it a *Sphaerella*, as assumed by FÜCKEL. *Chaetopyrena* Sacc. 1883 is antedated by PASSERINI's genus of the same name published in 1881. On the type specimen of *C. hesperidum* Pass. occurs a *Ceuthospora*. GIBELLI and PENZIG have confounded these 2 different fungi and consequently the valid genus *Chaetopyrena* Pass. is not given in the Syll. Fung. *Ceuthospora phacidioidea* f. *Citri* Penz. cannot be considered identical with *Chaetopyrena hesperidum* Pass. *Sclerochaeta* v. H. 1917 erected on *Phoma penicillatum* Fuckel is identical with *Chaetopyrena Passerini*. Therefore *C. hesperidum* Passerini should be called *C. penicillatum* (Fuck.) v. H.; it is the imperfect stage of a *Pyrenophora*. *Pyrenochaeta destructiva* MacAlp. may be a related *Chaetopyrena*.—*Phyllosticta Rosae* Roberge is discarded. *P. Rosae* Desm. is probably identical with *P. Rosarum* Pass., which is apparently based on the spermogonia of *Phragmidium subcorticium*. *Phyllosticta rosicola* Massalongo is shown to be a *Stictochorella* v. H. and probably belongs to *Sphaerella rhodophila* Passerini. *Phoma exigua* Desmazières is discarded. *Hendersonia* (*Piestospora*) *smilacina* Desmazières is referred to the genus *Cylindrophoma* as *C. smilacina* (Desm.) v. H. The genus *Plenozythia* is referred in von Höhnel's system of the Fungi Imperfecti to the *Sphaerioidae-ostiolatae* next to *Macrophoma*. All forms of brownish, or olive-brown color, even if soft-fleshy, are placed in the *Sphaerioidaceae*. Forms with hyaline pycnidia having a brown beak are referred to the *Sphaerioidaceae*. The same procedure is adopted for the *Sphaeriaceae* and *Hypocreaceae*. *Sphaeria Leguminis-Cytisi* Desmazières is referred to *Diplodina Leguminis-Cytisi* (Desm.) v. H. *Ascochyta Laburni* Sacc. and *Diplodina Laburni* Brun. are probably only forms of *D. Leguminis-Cytisi* (Desm.) v. H. As

far as known all species of *Diplodina* are conidial stages of *Didymella*, and as a member of this ascomycetous genus is sparsely present in the type-specimen the fungus is called *Didymella Leguminis-Cytisi* v. H. *Botryella nitidula* Sydow is a *Dariuca* parasitic on a *Puccinia*. The *Puccinia* is a new species and is named *P. aculeatispora* v. H. *Sphaeria perforans* Roberge should be known as *Tiarospora perforans* (Roberge) v. H. This fungus is always accompanied by *Leptosphaeria sabuletorum* (Berk. et Br.) v. H. and is probably its conidial stage; the complete synonymy is given. *Haplosporella longipes* Ellis et Barth. is said to be a typical *Sphaeropsis* [*S. longipes* (E. et B.) v. H.]; it is perhaps only a form of *Sphaeropsis Mori* Berlese. *Pleosphaeropsis Dalbergiae* Diedicke, type of the genus, is shown to be merely a strongly erumpent *Sphaeropsis* which has a tendency toward multi-chambering and fusion of some pycnidia with each other; *Pleosphaeropsis* is dropped. *Coniothyrium olivaceum* Bon. var. *Pini-silvestris* Ferraris 1902 is treated as *Aposphaeriopsis Pini-silvestris* (Ferraris) v. H. *Coniothyrium Cedri* Rolland is possibly identical with it. The genus *Haplosporella* Speg. is a mixture of very different, unrelated forms. The type, *H. chlorostroma* Speg., is the same as *Camarosporium Robiniae* (West) Sacc., differing only in that for the most part the septation of the conidia has not occurred. *C. Robiniae* (West) Sacc., *C. fenestratum* (B. & C.) Sacc., and *C. Pseudoacaciae* Brun. are said to be identical. *Haplosporella Brunaudiana* Passerini is over-mature *Anthostomella Scopariae* H. Fabre. The old perithecia are used as hosts by an *Eriospora*, for which *E. biparasitica* v. H. is suggested. *Haplosporella caespitosa* (B. et Br.) Sacc. is perhaps a conidial form of *Cucurbitaria Hederae* Winter. *Haplosporella dothideoides* Sacc. is an over-mature member of the Phyllachoraceae, *Phaeochora Chamaeropsis* (Cooke) v. H. *Haplosporella minor* Ell. and Bartholomew is probably the conidial form of an unknown *Cucurbitula*, and *Sclerothyrium minor* (Ell. and B.) v. H. is suggested as its name. *Haplosporella missouriensis* Bubák is considered a *Dothiorella* with colored conidia. *Haplosporella Rhamni* Diedicke is called *Sclerothyrium Rhamni* (D.) v. H. *Coniothyrium insitivum* Sacc. is said to be a mixed species and in part is referred to a species of *Sclerothyrium*. *Haplosporella dendritica* Raciborski is probably a *Lasmenia* with a well-developed stromatic tissue. Certain species of *Haplosporella* are said to have demonstrable conidiophores; a new genus, *Microsporella*, is created for these. *M. pityophila* v. H. is the conidial stage of *Cucurbitaria pityophila* (K. and S.) de Not. *Stenocarpella Zeae* Sydow should be called either *Macrodiplodia macrospora* (Earle) v. H. or *Diplodia Zeae* (Schw.) Lévl. var. *macrospora* (Earle) v. H. Ten different forms of *Septoria* described on the leaves of species of *Convolvulus* are discussed. They are said to represent but 2 different species, *Septoria Convolvuli* Desm. and *Hendersonia Calystegiae* (Westendorp) v. H.; a complete synonymy is given. *Taeniophora acerina* Karsten is transferred to the Sphaerioideae-astomae from the Excipulaceae. *Sphaeronaemella* Karsten was based on a *Ceratostomella*-like ascomycete. *Sphaeria vitrea* Corda is made the basis of a new genus of the Nectrioidaceae called *Hyalopycnis*; some related species of *Hyalopycnis* are perhaps conidial stages of *Hypomyces*. The new genus *Mycorhynchella* (Nectrioidaceae) is described. It differs from *Mycorhynchus* Sacc. in the micro-plectenchymatous structure of the pycnidia and in the conidia. A new genus, *Cyanophomella* v. H. (Nectrioidaceae-ostiolatae) is based on *Phoma acervalis* Sacc. *Botryogene* Sydow is identical with *Stagonostroma* Diedicke and *Botryogene visci* Sydow becomes *Stagonostroma visci* (Syd.) v. H. It is considered a pycnidial stage of a *Gibberella*. The nomenclatorial tangle existing in connection with the generic names *Chaetostroma* and *Amerosporium* is discussed and several new binomials are proposed. *Chaetodiscula hystericiformis* Bubák et Kabát is identical with *Myrothecium typhae* Fuckel, and *Chaetodiscula* Bub. et Kab. is identical with *Myzormia* Berk. et Br. The genera *Dinemasporium* Lévl., *Pseudolachnea* Ranojevic, and *Dinemasporiopsis* Bub. et Kab. are identical. A new genus, *Bactrexipula*, is created and referred to the Patelloidaceae-Excipulatae. The synonymy of *Psaltidosperma mirabile* Sydow is given. It probably represents a new genus, *Eriosporella* v. H., of the Melanconiaceae. The description of *Hainesia* Ellis et Sacc. is amplified. *Dacryomyces Lythri* Desmazières is a *Hainesia* and is called *H. Lythri* (Desm.) v. H. *H. tremellina* Sacc. is a typical *Hainesia*. *H. Rubi* (Westendorp) Sacc. is not a *Hainesia* and is provisionally designated as *Leptosporium Rubi* (West.) v. H. *Hainesia Feurichii* Bubák probably belongs to *Pseudopeziza*. *Hainesia taphrinoides* D. Sacc. et Cavara is to be cancelled. *Phyllosticta destructiva* Desm. is said to

be a mixed species. The variety *Malvarum* upon the leaves of *Malva sylvestris* and *M. rotundifolia* is taken as the type; it is identical with *Ascochyta destructiva* (Desm.) v. H. upon *Malva* and should bear the latter name. The variety *b Lycii* should be known as *Ascochyta Lycii* (Desm.) v. H. A new genus, *Stictopatella* v. H., is based on *Phyllosticta destructiva* var. *c Evonymi* Desm. The type species is *Stictopatella Evonymi* (Desm.) v. H. The various species of *Phyllosticta* described upon *Hedera* are the same. *Apiosporium Fumago* Fuckel is called *Diplopettis Fumago* (Fckl.) v. H. *Peltaster Hedyotidis* Sydow is said not to be related to *Eriothyrium dubiosum* Speg.; it is a conidial stage of one of the *Coccodiniaceae*. *E. fuegianum* Speg. belongs to the *Pycnothyriaceae*. An amended description is given for the genus *Asteromella* Pass. et Thüm. *Sacidium alpestre* Cesati is said to be hardly distinguishable from *Leptothyrium vulgare* (F.) but is called *L. alpestre* (Ces.) v. H. The conidial stage of *Euryachora betulina* (Fr.) Schröter is a member of a new genus of the *Leptostomaceae*, here named and described as *Didymochora* v. H. The genus *Dothiorella* Sacc. is a composite genus; many transfers to other genera are made and discussed. A description of the new genus *Sclerothyrium* v. H. is given followed by the complete synonymy. The type is *S. Tamarisci* (Mont.) v. H. *Sphaeropsis conglobata* Sacc. is said to be a typical *Hendersonula* Speg. and therefore must be called *H. conglobata* (Sacc.) v. H. It is probably the conidial stage of *Dothidea virgultorum* (Fr.) Wint. *Sphaeria oreades* Fries is merely a differently developed leaf-inhabiting form of *Dichomera Saubinetii* (Mont.) Cooke, as a variety of which it is named *oreades* (Fr.) v. H. The characterization of the genus *Dichomera* Cooke-Sacc. is amended and a new genus, *Pseudodichomera* v. H., is erected for *Dichomera varia* (Pers. ?) Diedicke, which is doubtless the conidial stage of *Cucurbitaria bicolor* Fuckel. *Dichomera Elaeagni* Karsten is given as *Pseudodichomera Elaeagni* (K.) v. H.; *Camarosporium Elaeagni* Potebnia is identical. *Dichomera Laburni* Cooke et Massee and the different species of *Camarosporium* which have been described on *Cytisus* are placed in *Pseudodichomera*. *Dichomera Tiliae* (Therry) Sacc., *D. sphaerosperma* (B. et C.) Sacc., and *D. stromatica* (Preuss.) Sacc. are genuine *Dichomeras*. *Dichomera mutabilis* Berk. et Broome is perhaps *Cucurbitaria Platani* Tavel. *Dichomera mutabilis* is a *Pseudodichomera*. On 1 specimen of *Dichomera mutabilis* occurred an undescribed *Botryodiplodia* which v. Höhnelt names *B. corylicola*. The genus *Pseudostegia* Bubák is based upon *P. nubilosa* (Ell. et Ev.) Bubák, which is identical with *Cryptosporium atrum* Kunze. *Cryptosporium* Kunze and *Cryptosporium* Sacc. are, notwithstanding the fact that they both possess hyaline conidia, different from one another. *C. atrum* Kze. is closely related to *Pilidium* Kunze (not Sacc.) and *Harposporella* v. H. An amended description of *Cryptosporium* Kunze (not Sacc.) is given. The genus *Placosphaeria* Sacc. (not deNotaris) is discussed. It is understood to contain only the characteristic forms of the conidial stage of typical species of *Euryachora* Fuckel; 12 species are critically considered. *Coniothyrium concentricum* (Desm.) Sacc. is given as *Dothisphaeropsis concentrica* (D.) v. H. *Coniothyrium Agaves* (Mont.) Sacc. is very similarly constructed and a comparison of the 2 fungi must show whether it is a question of form of growth of the same fungus due to external stimuli or whether it is a different fungus. *Readeriella mirabilis* Sydow may be related to *Dothisphaeropsis*. *Phoma jasminicolum* Desmazières is shown to be a *Stictochorella* v. H., and is called *S. jasminicola* (Desm.) v. H. *Stictochorella Juniperi* v. H. n. sp. is probably a conidial stage of a species of *Carlina* (Phyllachoraceae). The genus *Leptostromella* Sacc. was erected by Saccardo and Roumeguère as a section of *Leptostroma*. It contained to a certain extent *Leptostroma* with elongate conidia. However, the 2 genera are entirely distinct. The type species, *Leptostromella septorioides* Sacc., is the conidial stage of a *Phyllachora*. *Linochora* v. H., erected for the conidial stages of *Phyllachora* with thread-shaped conidia, is different from *Leptostromella* Sacc. *Leptothyrium Cytisi* Fuckel is shown to be *Leptostromella Cytisi* (Fuck.) v. H.; *Leptostromella Atriplicis* Bubák et Krieger is similar. *Septoria caricinella* Sacc. et Roumeguère is a *Linochora* and is called *L. caricinella* (Sacc. et Roumg.) v. H., and is assumed to be the conidial stage of *Phyllachora caricis*. *Diplodina samaricola* Diedicke is said to have been incorrectly and incompletely described by Diedicke; it represents a separate form genus, which von Höhnelt calls *Septochora*. *Diplodina samaricola* Diedicke should therefore be called *Septochora samaricola* (Died.) v. H. *Peltistromella brasiliensis* v. H. is said to be closely related to *Phragmopeltis* (P. H.) v. H. and *Peltistroma* (P. H.) v. H. but has 2-celled conidia. *Septoria*

macrospora Durieu et Montagne is shown to be closely related to *Kellermannia anomala* (Cooke) v. H., but is an independent genus which probably should be called *Piptarthron* Montagne. An amended description is given to the genus *Piptarthron* Montagne. *Ischnostroma Merrillii* Sydow is shown to be a conidial stage of a member of the Polystomellaceae, almost certainly an *Asterodothis* and not the conidial stage of a member of the Trichopeltaceae as previously stated. *Sirosphaera botryosa* Sydow is placed among the Pachystromaceae-Dothideales-Superficiales where it is supposed to be the conidial stage of a member of the Dothideaceae. On the type specimen of *Phoma Ilicis* Desmazières were found 2 fungi, *Phyllosticta ilicicola* C. et Ell., and *Phoma Ilicis*, which is a *Phomopsis* and is called *P. Ilicis* (D.) v. H. *Phoma lirella* Desmazières is a *Phomopsis*, *P. lirella* (D.) v. H., and on the same stem occurs the related *Diaporthe (Euporthe) Vincæ* Cooke. *Phoma subnervisequum* Desmazières is a typical *Phomopsis* which must be called *P. subnervisequia* (Desm.) v. H. Since *Diaporthe Laschii* Nitschke occurs on *Evonymus*, *Phomopsis subnervisequia* probably belongs to it. *Phoma effusum* Roberge must be called *Phomopsis effusa* (Rob.) v. H., and it is probably the conidial stage of *Diaporthe (Tetrastaga) Therriana* P. et S. *Phoma Hellebori* Br. et Har. 1891 is said to be the same fungus. Only *Diaporthe Phoenicis* Pat. and *D. Chamaeropina* Gaja have been known upon palm leaves. A number of forms described on them as *Phoma* and *Phyllosticta* are certainly species of *Phomopsis*. Thus *Phoma cocoïna* Cooke, *P. palmicola* Winter, *P. Phoenicis* Sacc., *P. Phoenicis* (Ces.) Sacc., and *P. coccophila* Speg. will probably all be reduced to 2 species. *Phomopsis syngenesia* (Brun.) v. H. is said to be the conidial stage of *Diaporthe syngenesia* (Fries). It is also stated that *Phoma syngenesia* P. Brunaud and *P. Frangulae* Oudemans are identical with *Phomopsis syngenesia* (Brun.) v. H. *Pyrenochaetinia obtegens* Sydow shows no bristles; it may for the present be placed in *Sclerophomina* v. H. *Sphaeria Miribelii* Fries should be known as *Sarcophoma Miribelii* (Fries) v. H.; the complete synonymy is given. This fungus is probably the conidial stage of *Naevia pallida* (Fuck.) Rehm. *Phoma nitidum* Roberge in herb. is transferred to the genus *Sclerophoma* as *S. nitida* (Rob.) v. H., although not a typical species. *Sphaeria aliena* Fries is *S. foveolaris* Fries 1823; a complete synonymy is given [see also Hedwigia 59: 270. 1917]. *Phoma punctiformis* Desmazières is referred to the genus *Sclerophoma* as *S. punctiformis* (Desm.) v. H. *Bakerophoma Sacchari* Diedicke, type of the genus, is shown to be worthless and the genus is cancelled.—E. E. Honey.

1525. JOHNSTONE, JAS. Fungoid infection of plaice. Proc. and Trans. Liverpool Biol. Soc. 34: 120-121. Fig. 1-2. 1920.—Two plaice that had died in the spawning pond were found to have their liver, spleen, kidneys, and peritoneum containing small whitish nodules 1-2 mm. in diameter. The nodules were found to consist of a fungus body, composed of mycelium and sporangium-like bodies.—Charles Drechsler.

1526. KAUFFMAN, C. H. *Isoachlya*, a new genus of the Saprolegniaceae. Amer. Jour. Bot. 8: 231-237. 2 pl. 1921.—This new genus is established to include 3 species: *I. toruloides*, a new species here described under the joint authorship of KAUFFMAN and COKER; *I. paradoxa* (Coker) comb. nov., and *I. monilifera* (de Bary) comb. nov. These are all characterized by the presence of the cymose *Achyla* mode of formation of secondary sporangia, coupled with diplanetic zoospores. *I. toruloides* was studied in detail and the morphological and physiological differences resulting from cultivation on various substrata are recorded.—E. W. Sinnott.

1527. MARCHAL, EL., ET EM. [MARCHAL]. Contribution à l'étude des champignons fructicoles de Belgique. [Contribution to the study of the fruit-inhabiting fungi of Belgium.] Bull. Soc. Roy. Bot. Belgique 54: 109-139. 1921.—The author identifies 67 species, of which 24 are species or varieties new to science. The investigations have been carried out for 6 years on fleshy fruits, especially on the stone-fruits. Frequent resort to pure cultures from mycelium was made. Besides forms already known, descriptions of the following new species are given: *Pleospora Lycopersici*, *Diaporthe perniciosa*, *Dothiorella vinosa*, *D. Mali* Karst. var. *globuligera*, *Fuckelia conspicua*, *F. Malorum* Oud. var. *macrosporium*, *F. rimosum*, *Cytosporella fructorum*, *Hendersonia vagans* Fuck. var. *fructicola*, *Oospora umbrina*, *Hyalopus pruinosis*,

Penicillium flavum, *P. olivaceum* Wehmer var. *discoideum*, *Gliocladium cinereum*, *Ramularia cerasorum*, *Torula lamelligera*, *Alternaria tenuis* Nees. var. *Mali*, *Tilachlidium nigrescens*, *T. Malorum*, *Isaria felina* Fr. var. *pirina*, *Graphium fructicolum*, *Tubercularia piricola*, *Dendrodochium pulchrum*, *D. versicolor*.—Henri Micheels.

1528. MAYOR, EUG. Contribution à l'étude de la flore mycologique de la région de Chateau-d'OEx. [Contribution to the fungus flora of the Chateau-d'OEx region.] Bull. Soc. Vaudoise Sci. Nat. 52: 395-418. 1919.—The author studied the fungus flora prevailing near Chateau d'OEx during the latter part of the summer and the fall of 1918. It was found to be richer than might have been expected from the meagre attention given to the region in floristic works on Switzerland. An annotated list of the parasitic forms, including, however, only the Peronosporaceae, Ustilaginaceae, Uredineae, Protomycetaceae, and the Erysiphaceae, is given, supplementing a similar one previously issued by the author on the fungus flora in the vicinity of Leysin, the 2 constituting an account of the parasitic fungi thriving in the Vaudoise Alps. In the present list, the Uredineae, represented by 142 species, and the Erysiphaceae, represented by 17 species, easily predominate, a fact partly attributable to the season of the year during which the collections were made. Of the Peronosporales 10 species are mentioned, and of the Ustilaginales 9 species. *Protomyces macrosporus* Unger, *P. Kreuthensis* Kühn, and *P. Leucanthemi* Magnus represent the Protomycetaceae.—Charles Drechsler.

1529. MURRILL, WILLIAM A. Light-colored resupinate polypores - IV. Mycologia 13: 171-178. 1921.—Descriptions are given of 16 species of yellow Porias, including the following new species: *P. ochracea*, *P. flavida*, *P. Calkinsii*, *P. Parksii*, *P. subradiculosa*, *P. flavilutea*, and *P. jalapensis*.—H. R. Rosen.

1530. PETCH, T. Hypocreaceae Zeylanicae. Ann. Roy. Bot. Gard. Peradeniya 7: 85-138. 1920.—This paper consists of 2 parts, the 1st consisting largely of critical notes on Berkeley and Broome's types, the 2nd a systematic list. Eighty-one species in 2 genera are enumerated from Ceylon. The following are described as new: *Nectria discoidea*, *N. bomba*, *N. albofulta*, *N. sulcispora*, *Bresadolella nigra*, *Hypocrea gigantea*, *H. brunnea*, *H. extensa*, *H. chlorostroma*, *H. mellea*, *Hypomyces pallidus*, *Calonectria oodes*, *Gibberella rugosa*, and *Micronectria eugeniae*.—E. D. Merrill.

1531. PETHYBRIDGE, GEO. H. Sexual organs of Phytophthora. Nature 107: 204. 1921.—It was reported in Nature (93: 226. 1914) that in *P. erythroseptica* and *P. infestans* the oogonial incept penetrates the antheridium at an early stage, traverses it, emerges, and then swells to form the oogonium proper. This type of sexuality occurs also in other species. One on decaying apples has been found occasionally to show this phenomenon; also normal lateral fusion of sex organs on the same individual. Occasional occurrence of the oogonial penetration should be looked for in species of the *cactorum* or *omnivora* group. Exchange of material is desired by the author.—O. A. Stevens.

1532. SCHNEIDER, ALBERT. "California bees." Druggists Circ. 65: 10, 16-17. 1921.—An account is presented of a little known ferment, some of its uses, and commercial possibilities of growing it.—C. M. Sterling.

1533. SHEAR, C. L., and B. O. DODGE. The life-history and identity of "Patellina fragariae," "Leptothyrium macrothecium," and "Peziza oenotherae." Mycologia 13: 135-170. Pl. 8-10, fig. 1-5. 1921.—The authors present "an account of the life-history, morphology and taxonomy of a discomycete, *Pezizella lythri* (Desm.) Shear & Dodge, (comb. nov.) which is found on a great variety of plants, and has three stages in its life-cycle: sporodochia, pycnidia, and apothecia." The conidial stage belongs to the form genus *Hainesia*, the pycnidial is *Sclerotiopsis concava* (Desm.) Shear & Dodge comb. nov., and the ascigerous stage belongs to *Pezizella*. "Cross inoculation experiments show that the fungus is a weak parasite and passes readily under favorable conditions from one host to another." About 50 hosts are listed, including species of *Acer*, *Ampelopsis*, *Castanea*, *Cercis*, *Cornus*, *Duchesnia*, *Epilob-*

ium, *Eucalyptus*, *Fragaria*, *Gaultheria*, *Gaura*, *Hicoria*, *Jambosa*, *Lythrum*, *Nyssa*, *Oenothera*, *Vaccinium*, *Pelargonium*, *Populus*, *Potentilla*, *Prunus*, *Quercus*, *Rhus*, *Ribes*, *Rosa*, *Rubus*, *Salix*, *Smilax*, *Ulmus*, and *Vitis*.—H. R. Rosen.

1534. STONE, R. E. Deadly poisonous mushrooms. Canadian Field Nat. 34: 74-78. Fig. 1-4. 1920.—Five of the most poisonous mushrooms growing in the woods of Ontario are carefully described. The rules often applied to the gathering of mushrooms are included.—W. H. Emig.

1535. ZUNDEL, GEORGE L. Smuts and rusts of northern Utah and southern Idaho. Mycologia 13: 179-183. 1921.—Nine smuts and 25 rusts are listed, together with hosts and localities in which collections were made.—H. R. Rosen.

LICHENS

1536. ANONYMOUS. A rare lichen. Proc. Linn. Soc. New South Wales 45: 265. 1920.—A note is recorded on a lichen collected on Mount Kosciusko by Miss A. V. Duthie. One specimen collected in 1890 by Rev. F. R. M. Wilson is labelled *Dufourea madreporiformis* (Wulf.) Ach. It seems to have close affinities with *Dactylina artica* (Hook) Nyl. No apothecia are present.—Eloise Gerry.

1537. SAMPAIO, GONCALO. Novas contribuições para o estudo dos liquenes portugueses. [New contributions to the study of Portuguese lichens.] Broteria Ser. Bot. 19: 12-35. 1921.—This is a list of 74 species of lichens, mostly new to the flora of Portugal. Brief characterizations accompany each species mentioned and there is careful citation of localities. New combinations occur in *Bacidia*, *Buellia*, *Catillaria*, *Lecania*, *Lecanora*, *Lopadium*, and *Solenospora*.—*Lecanora gerezina* Samp. (nom. nov.) is proposed for *L. tristis* Samp. (non Merezk).—*Acarospora Zahlbrueckneri* Samp. and *Lecanora lisbonensis* Samp. are proposed as new.—E. B. Chamberlain.

1538. WAINIO, E. A. Lichens ab A. Yasuda in Japonica collecti. (Continuatio I.) [Lichens collected in Japan by A. Yasuda.] Bot. Mag. Tôkyô 35: 45-62, 63-79. 1921.

BACTERIA

1539. KUFFERATH, H. Bacterium Puttemansi Kufferath nov. sp. Microbe produisant des tacher sur la tomate (*Lycopersicum esculentum*) conservée. [Bacterium Puttemansi Kufferath n. sp., cause of spotting of canned tomatoes.] Bul. Soc. Roy. Bot. Belgique 54: 190-194. 1921.—The spots appear in the form of small yellowish pustules resembling the pimples of human boils. The mycological features of the cultures and the inoculations are given. This is the first time that an organism causing lactic fermentation has been found causing lesions on preserved vegetables.—Henri Micheels.

1540. SCHNEIDER, ALBERT. Bacteriology from the physico-astronomical viewpoint. Pacific Pharm. 12: 107-114. 1918.

MYXOMYCETES

1541. MEYLAN, CH. Notes sur quelques espèces de Myxomycetes. [Notes on several species of Myxomycetes.] Bull. Soc. Vaudoise Sci. Nat. 52: 447-450. 1919.—The author made a study of 3 forms derived from Persoon's original *Trichia botrytis*: (1) *T. botrytis* Pers. gen., (2) *T. lateritia* Lev., and (3) *T. subfusca*, the latter 2 being regarded by some authors as varieties of the first, and by others as independent species. He concludes that 3 good species are here represented, and defines the specific differences. *T. lateritia* alone always bears the sporangia aggregated in groups of 4-10, and apparently served as type for Persoon's *T. botrytis*. *T. subfusca* is distinguished from the other 2 by a marked difference in color of plasmodium.—A new species of *Hemitrichia* is proposed, *H. obrussea*; a new species of *Lamproderma*, *L.*

Gulielmae, dedicated to Miss Lister, is described, differing from *L. violaceum* in possessing smaller sporangia and larger spores. The genus *Diderma* is enriched by the addition of 2 new varieties, — *D. simplex* Schroet var. *echinulatum* var. nov. and *D. montanum* var. *roseum* var. nov.—Charles Drechsler.

PALEOBOTANY AND EVOLUTIONARY HISTORY

EDWARD W. BERRY, *Editor*

(See in this issue Entries 1374, 1497)

PATHOLOGY

G. H. COONS, *Editor*

C. W. BENNETT, *Assistant Editor*

(See also in this issue Entries 1143, 1147, 1266, 1419, 1421, 1435, 1471, 1498, 1517, 1617, 1641, 1642)

PLANT DISEASE SURVEY (REPORTS OF DISEASE OCCURRENCE AND SEVERITY)

1542. ANONYMOUS. Mosaic or mottling disease of sugar-cane. Agric. News [Barbados] 19: 345. 1920.—A communication to the local press from the Director of Agriculture, Barbados, is noted announcing the presence of the disease in that Colony. Canes found in St. Lucia and thought to be affected, proved on closer examination to be free from the disease though presenting a similar appearance.—J. S. Dash.

1543. HOWARD, W. L. An old disease in a new place. Proc. Amer. Soc. Hort. Sci. 17: 102-104. 1920 [1921].—Due to the fact that the regions of California in which stone fruits are grown are sections without summer rains, brown rot (*Sclerotinia cinerea*) was practically unknown. During the past 5 years considerable damage has been done but almost exclusively in the cool, moist region along the coast or in the vicinity of San Francisco Bay. The disease does most damage where frost injury is likely to occur. The atmosphere is quite humid in this region but why the fungus seems to have become adapted to spots where low temperature prevails around blooming time, rather than in warm places, is not clear. It was found that the disease could be controlled on apricots to within 4 or 5 per cent by a single application of either lime-sulphur (1 to 10), dry lime-sulphur (12 pounds to 50 gallons), or Bordeaux mixture (4-5-50), when the trees were sprayed after the fruit buds were noticeably swollen. Spraying after the trees are passing out of bloom does very little good, and spraying before the buds swell is equally unprofitable. Apparently the disease attacks the trees when they are in full bloom. Crude oil emulsion, which is commonly used in winter against brown apricot scale, gives promise of being an effective remedy where spraying is done after the buds begin to swell. A distillate emulsion, lime whitewash, and dry sulphur each have failed to control. Self-boiled lime-sulphur applied when the apricots were half grown had no effect upon the disease but completely checked the development of the fruit. Brown rot is not a serious problem with the ripe fruit, apparently because of the dryness of the air at the ripening period. The disease also attacks peach and plum but usually not seriously; in one locality it became serious on peaches at ripening time.—H. W. Richey.

1544. LEE, H. A., AND F. B. SERRANO. Banana wilt in the Philippines. Philippine Agric. Rev. 13: 128-129. 1920.—This disease, caused by *Fusarium* sp., is recorded from the Philippines, but the authors note that a number of local varieties of the banana are resistant or immune.—E. D. Merrill.

1545. LEE, H. A., AND H. S. YATES. The distribution of pink disease. Philippine Agric. Rev. 13: 115-116. 1920.—A short note is presented indicating that this disease of citrus hosts, caused by *Corticium salmonicolor*, was introduced into the Philippines earlier than the authors formerly supposed.—E. D. Merrill.

1546. MASSEY, L. M. Experimental data on losses due to crown canker of rose. *Phytopathology* 11: 125-134. 1921.—Ophelia roses were grown under glass in infested and non-infested soil during a period of 3 years. A record was kept of the plants showing infection and of the number of blossoms produced. Plants becoming infected with the canker fungus (*Cylindrocladium scoparium*) were not killed outright, but were weakened and produced fewer blossoms than healthy plants. In this experiment the average decrease was about 10 blossoms per plant.—B. B. Higgins.

1547. NEGER, F. W. Die Krankheiten unserer Waldbäume und wichtigsten Gartengeholze. [The diseases of our forest trees and most important garden shrubs.] viii + 286 p., 234 fig. Ferdinand Enke: Stuttgart, 1919.—After a short introduction the author presents his material in 2 main divisions. The 1st part treats diseases resulting from frost, heat, lack of or too much light, disturbance of the water balance, lack of or too much nutrient, poisonous gases, smoke, atmospheric disturbances such as wind, snow, lightning, etc., and mechanical injuries. The 2nd part opens with a general discussion of immunity, susceptibility, infection, host reaction, and control of parasitic diseases, and then takes up bacterial diseases, fungous diseases, and the injuries caused by lichens and parasitic phanerogams. The data on any particular disease are presented from the symptomatic standpoint, but short keys on the mycological differences of the parasitic species within a given genus are inserted whenever necessary. Footnote references to pertinent literature, in many cases accompanied by abstracts of the results obtained by the investigators cited, are used frequently. At the end of the book concise symptomatic descriptions of the diseases discussed in the text are given under the name of the host.—Reginald H. Colley.

1548. WOLF, F. A., AND S. G. LEHMAN. Notes on new or little known plant diseases in North Carolina in 1920. *Ann. Rept. North Carolina Agric. Exp. Sta.* 43: 55-58. 1920 [1921].—The authors mention *Phoma corvina* on cotton following injury by lightning, and a root mold, *Penicillium spiculisporum*, described in *Mycologia* 12: 168-174. 1920; pod rot of cowpeas caused by *Choanephora cucurbitarum*; pod blight (*Diaporthe phaseolarum*) of lima beans; fig anthracnose (*Glomerella cingulata*); soft rot of peppers (*Pythium de Baryanum*); mosaic, anthracnose (*Glomerella cingulata*), and *Phoma* blight (*Phoma* sp.) of soy bean; buckeye rot (*Phytophthora terrestris*) of tomato; and downy mildew (*Peronospora viciae*) of vetch.—F. A. Wolf.

THE HOST (RESISTANCE, SUSCEPTIBILITY, MORBID ANATOMY AND PHYSIOLOGY)

1549. ADAMS, J. F. Observations on wheat scab in Pennsylvania and its pathological histology. *Phytopathology* 11: 115-124. Pl. 2-3, fig. 1. 1921.—Under Pennsylvania conditions wheat (*Triticum sativum*) seedling infection by *Gibberella saubinetii* is comparatively unimportant. Head infection is much more prevalent, occurring in all the wheat-growing centers of the state. The majority of infections occur when the kernels are in the "milk" stage and injury is usually confined to 1 or 2 spikelets of a head. The kernels in such spikelets are conspicuously shriveled. The fungous mycelium apparently enters through the germinal end of the seed; and from this point, it spreads throughout the interior. The endosperm usually fails to develop. The embryo is entirely disorganized and replaced by a mass of intertwining mycelium. Apparently the mycelium does not spread through the rachis from one spikelet to another. In heads artificially inoculated during the flowering stage, the ovules failed to develop.—B. B. Higgins.

1550. ANDERSON, H. W. Some factors influencing the practical control of blister canker in apple orchards. *Proc. Amer. Soc. Hort. Sci.* 17: 111-116. 1920 [1921].—This is a report of investigations in Illinois orchards. The important factors in the etiology of the fungus are source and manner of infection and the life of the fungus in the host. The sources of infection are ascospores, conidia, and mycelium. Due to "(1) their immunity from injury by ordinary weather conditions, (2) their long vitality, (3) their ability to infect readily when

on the proper pabulum, (4) their great abundance, and (5) the provisions for their wide dissemination," the ascospores are the main source of infection. The conidia are produced in enormous numbers and may appear the first or any subsequent season. They are quickly killed by drying and probably cause but little infection, for repeated failures have resulted from attempts to cause infection under natural conditions. The mycelium is capable of causing infection but it is probable that such infections are rare. The manner of infection is influenced by disseminating agents such as water, wind, insects, pruning tools, etc.; by the opportunity for infection such as is occasioned by the presence of large wounds on older wood; and by the physical conditions such as age and vigor of tree and weather conditions, the canker being more prevalent on older trees and during dry seasons. The mycelium grows rapidly in the dry wood and may extend several feet from the apparent canker.—In Illinois the chief varieties injured are Ben Davis, Gano, Chenango, and Willow Twig. The author thinks that with the elimination of Ben Davis there would be but little trouble from the disease. Wild hosts, especially the mountain ash, should also be destroyed.—The author gives a plan for the practical control of blister canker which includes avoiding susceptible varieties, removing diseased young trees, and disinfecting and carefully pruning all diseased trees in order to destroy all ascospores.—H. W. Richey.

1551. CHEMIN, E. Action d'un champignon parasite sur *Dilsea edulis* Stackhouse. [Effect of a fungus parasitic on *Dilsea edulis*.] Compt. Rend. Acad. Sci. Paris 172: 614-617. 1921.—A description is given of the effect of parasitic fungi upon the plants of this red alga. The author discusses the parasitism and symbiosis of fungi living in association with algae.—C. H. Farr.

1552. McLEAN, FORMAN T. A study of the structure of the stomata of two species of *Citrus* in relation to citrus canker. Bull. Torrey Bot. Club 48: 101-106. 1 fig. 1921.—Stomata of Szinkum mandarin, which is resistant to Citrus canker (*Pseudomonas citri*), and of Florida seedling grapefruit, which is susceptible, are compared and those of the resistant form are found to have a broad ridge of entrance overarched the outer chamber. Such an arrangement practically excludes water from the stomata of the mandarin and accounts for resistance to canker bacteria.—P. A. Munz.

1553. McLEAN, FORMAN T., AND H. ATHERTON LEE. The resistance to citrus canker of *Citrus nobilis* and a suggestion as to the production of resistant varieties in other citrus species. Phytopathology 11: 109-114a. Fig. 1. 1921.—The horticultural varieties of the Mandarin orange (*Citrus nobilis* var. *deliciosa*) have been mentioned by various writers as truly resistant to canker (*Pseudomonas citri*). The fact that a few scattered cankers frequently occur on trees of these varieties led to an investigation of the resistance of the latter. Inoculation with pure cultures of *Pseudomonas citri* were made upon wounded and unwounded leaves of three varieties of this group. The inoculation of wounded leaves gave a percentage of infection fully as high as with the more susceptible species of *Citrus*; while with the unwounded leaves only a few cankers developed, evidently at insect or other punctures. The results indicate that the resistance is due to the nature of the epidermis (see preceding entry). The utilization of graft hybrids, to transfer the Mandarin epidermis and resistance to other more susceptible varieties without changing the quality of the fruit, is suggested.—B. B. Higgins.

DESCRIPTIVE PLANT PATHOLOGY

1554. BJUL, PAUL A. VAN DER. On a fungus, *Ovulariopsis Papayae* n. sp., which causes powdery mildew on the leaves of the pawpaw plant (*Carica Papaya* L.). Trans. Roy. Soc. South Africa 9: 187-189. Pl. 10, 1 fig. 1921.—A description is given of the fungus which is thought to be the conidial stage of a *Phyllactinia*.—E. M. Doidge.

1555. CARPENTER, C. W. Report of the Division of Plant Pathology. Hawaii Agric. Exp. Sta. Rept. 1919: 49-54. Pl. 7-8. 1920.—Discussion of taro rot (probably *Pythium deBaryanum*), taro stem rot (*Sclerotium rolfsii*), and of the control of banana freckle disease

(*Phoma musae*) with Bordeaux mixture plus a resin-salsoda sticker is given. An annotated list of diseases affecting taro, peanuts, figs, bananas, and grape vines is included.—J. M. Westgate.

1556. ELLIOTT, JOHN A. A mosaic of sweet and red clovers. *Phytopathology* 11: 146-148. *Fig. 1.* 1921.—A mosaic disease was found occurring naturally on plants of red clover (*Trifolium pratense*) and sweet clover (*Melilotus alba*). Cross inoculations proved that the disease could be easily transferred from one species to the other and from both to plants of *Vicia faba* and *Medicago arabica*. All attempts to inoculate plants of *Medicago sativa* and *Trifolium repens* failed.—B. B. Higgins.

1557. ENSLOW, ELLA M. A., AND FREDERICK V. RAND. A lotus leafspot caused by *Alternaria nelumbii* sp. nov. *Phytopathology* 11: 135-140. *Pl. 4, fig. 1.* 1921.—A leaf-spot of Egyptian lotus (*Nelumbium speciosum*) is ascribed to *Alternaria nelumbii* n. sp. The spots appear first as small, smooth, reddish-brown flecks which later enlarge to a diameter of 5-10 mm. and tend to develop concentric light and darker markings. The above named fungus was isolated from these spots and its pathogenicity proved.—B. B. Higgins.

1558. EYER, J. R. The influence of leaf hopper control on potato yields. *Jour. Econ. Entomol.* 14: 69-71. 1921.—The author reports experimental work with Bordeaux mixtures, Bordeaux-nicotine, lime-nicotine, and nicotine-soap for the reduction of burning caused by leaf hopper (*Empoasca mali*) and to determine the effect of these control measures upon yield. Bordeaux (4-4-50) gave the best practical control. One set of plots was sprayed by hand and another by machine; the results were decidedly in favor of machine spraying, both from the standpoint of hopper-burn control and from the standpoint of yield.—A. B. Massey.

1559. FABRICIUS. [Rev. of: GRÄBNER, PAUL. *Lehrbuch der nichtparasitären Pflanzenkrankheiten.* (Textbook of non-parasitic plant diseases.) 333 p., 244 fig. Paul Parey: Berlin, 1920.] *Forstwiss. Centralbl.* 43: 184-185. 1921.—This book corresponds, in the field of non-parasitic diseases, to VON TUBEUF's work on parasitic plant diseases. Forestry, while more or less helpless against parasitic diseases, can usually combat the others by means of silvicultural measures. Gräbner discusses the diseases under the following heads: Diseases due to (1) unfavorable soil conditions; (2) humidity and wind movement; (3) heat and light; (4) wounds; (5) noxious gases and liquids; (6) enzymes.—W. N. Sparhawk.

1560. FENTON, F. A. Progress report on the season's work on the production of potato tipburn. *Jour. Econ. Entomol.* 14: 71-83. 1921.—Studies and observations are reported on the nature of tipburn and habits of the insect which causes it. Tipburn was produced by the leaf hopper (*Empoasca mali*) to the same extent and equally rapidly under diverse environmental conditions of the host plants, such as soil type, soil moisture, humidity, and presence or absence of sunlight. The injury is local, not systemic, and is in itself the greatest factor in inducing burning. Severity of tipburn in fields is correlated with leaf-hopper population and not with sunlight, maximum temperature, or minimum humidity. Other potato insects are not concerned with tipburn. Mechanical injury such as needle punctures in veins gave no definite results. Complete severing of a midrib induced burning of leaflets in 19 days. Bordeaux mixture prevents tipburn by repelling ovipositing females.—J. E. Kotila.

1561. MÜLLER, B. Das Tannensterben im Frankenwalde. [Dying firs in the Frankenwald.] *Forstwiss. Centralbl.* 43: 121-130. 1921.—A discussion of the cause of extensive dying out of firs in the Frankenwald, with a criticism of some of SCHEIDTER's conclusions as to the causes, and remedies are given. Death appears to be due to an epidemic of the "Hallimasch" (*Agaricus melleus*), which is normally a saprophyte, but becomes parasitic under certain conditions, especially a prolonged drought. While Müller questions whether the methods of silvicultural management recommended by Scheidter will eliminate the disease, he suggests a number of points that need careful investigation.—W. N. Sparhawk.

1562. TAUBENHAUS, J. J., AND FREDERICK W. MALLEY. Pink root disease of onions and its control in Texas. Texas Agric. Exp. Sta. Bull. 273. 42 p., 3 fig. 1921.—The disease is widespread, being found in California, Iowa, Wisconsin, New York, and Bermuda Islands, as well as in Texas. It is suggested that the disease was probably introduced from Bermuda in shipments of dry sets. The cause of the disease is shown to be *Fusarium mali*. All varieties of onions tested except the Extra Early Red showed a high degree of susceptibility. Narcissus, tulip, freesia, lilies, etc., are not subject to pink root.—It seems probable that other associated organisms increase the virulence of the pathogene. Methods of control, such as crop rotation, fertilizers, and soil sterilization, are discussed.—L. Pace.

1563. VERMOESEN, M. Note sur la maladie du "coup de soleil" des cacaoyers du Mayumbe. [Note on the "sun stroke" disease of cacao trees in Mayumbe.] Bull. Agric. Congo Belge 11: 2-21. Fig. 1-41. 1920.—The "sun stroke" disease attacks principally the trunks of cacao trees. A parasitic fungus, *Diplodia theobromae*, develops on the affected trunk, blocks the conducting vessels, and leads rapidly to the death of the tree. The *Diplodia* attacking cacao trees in Mayumbe, W. Africa, is the same species to which is attributed "dieback" of cacao trees, *Hevea* spp., and also the "brown rot" of cacao beans in various tropical countries. The *Diplodia* probably attacks trees of low vitality; it enters the trunk through wounds and acts so rapidly that trees which have formed fruits at the beginning of January are dead toward the end of February. Distribution is affected by wind, birds, insects, and rain. In dealing with this disease 2 factors must be considered; the primary or determining cause, which is still unknown, and the secondary cause, which is the *Diplodia*. Various theories have been advanced as to primary cause; planters attribute it to sun-scald, but this theory is not tenable. Certain other possibilities are discussed, particularly injury caused by borers and other insects, the damage done by termites, and the possible presence of another fungus hitherto undetected. Precautions recommended comprise general sanitary measures, the choice of suitable varieties, and attention to soil drainage.—E. M. Doidge.

1564. VINCENS, F. Parasitisme du Schizophyllum commune Fries sur la canne à sucre. [Parasitism of Schizophyllum commune on sugar cane.] Bull. Agric. Inst. Sci. Saigon 3: 65-68. Pl. 2. 1921.—The author verifies the findings of others that this fungus, although normally a saprophyte, occurs as a parasite on sugar cane.—E. D. Merrill.

1565. WEIR, JAMES R. Thelephora terrestris, T. fimbriata, and T. caryophyllea on forest tree seedlings. Phytopathology 11: 141-144. Pl. 5. 1921.—Thelephora terrestris has been found enveloping forest tree seedlings in nursery plantings and in the forests of various localities. The fungus closely envelops and smothers the young plants; but the mycelium does not penetrate the living tissue.—T. fimbriata and T. caryophyllea were also found enveloping seedlings of various conifers in nurseries and in the forests. Neither of the latter species has previously been reported on coniferous seedlings.—B. B. Higgins.

1566. WOLF, FREDERICK A. Report of the Division of Plant Pathology and Bacteriology. Ann. Rept. North Carolina Agric. Exp. Sta. 43: 53-55. 1920 [1921].—The author presents a concise statement of investigations with tobacco wildfire, soybean leafspot, velvet bean leafspot, false anthracnose of vetch, crop injury by borax, flagellation of legume-nodule bacteria, and tests with varieties of wheat resistant to leaf rust.—F. A. Wolf.

ERADICATION AND CONTROL MEASURES

1567. DARNELL-SMITH, G. P. [Rev. of: HURD, ANNIE MAX. Injury to seed wheat resulting from drying after disinfection with formaldehyde. Jour. Agric. Res. 20: 209-244. 6 pl. 1920 (see Bot. Absts. 8, Entry 1375).] Agric. Gaz. New South Wales 32: 323-325. 1921.

1568. FARLEY, ARTHUR J. Results of summer spraying and dusting peaches. Proc. Amer. Pomol. Soc. 35: 175-181. 1917 [1919].—A comparative test on peaches of the value of self-boiled lime-sulphur and hydrated lime-sulphur and glue is recorded. Both materials

gave excellent results in preventing scab (*Cladosporium carpophilum*). In a comparison of dusting and spraying for the control of peach scab, the dust mixture was practically as efficient as self-boiled lime-sulphur in the control of scab.—*E. C. Auchter*.

1569. HUNGERFORD, CHAS. W. A modification of the concentrated formaldehyde method of seed treatment. *Phytopathology* 11: 149-150. 1921.—A formaldehyde solution (1 part formaldehyde to 10 parts of water) is sprayed upon the grain.—*B. B. Higgins*.

1570. REDDICK, DONALD. Status of dusting in orchard protection. *Proc. Amer. Pomol. Soc.* 35: 162-172. 1917 [1919].—An account of the early history of spraying and dusting is recorded. A brief history and description of dusting work done upon other crops and in other states are given. The author concludes that the future possibilities of dusting as a method of orchard protection cannot be predicted at this time.—*E. C. Auchter*.

1571. RIEHM, E. Ein empfehlenswerter Reizapparat. [An excellent steeping apparatus.] *Illus. Landw. Zeitg.* 41: 4. 1 fig. 1921.—A description, with diagram, is given of a very elaborate apparatus for the treatment of seed wheat (1) with water for the separation of many diseased grains, and (2) with formaldehyde as a preventive of stinking smut (*Tilletia* spp.). Provision is also made for the subsequent drying of the seed.—*John W. Roberts*.

1572. THURSTON, H. W., JR. A note on the corrosive sublimate treatment for the control of *Rhizoctonia*. *Phytopathology* 11: 150-151. 1921.—Data are given on the growth from *Rhizoctonia sclerotia* taken from Irish potatoes treated with solutions of corrosive sublimate for various lengths of time.—*B. B. Higgins*.

MISCELLANEOUS (COGNATE RESEARCHES, TECHNIQUE, ETC.)

1573. ETER, BESSIE E. Field cultures of wood-rotting fungi on agars. *Phytopathology* 11: 151-154. 1921.—The equipment needed, the media used and the method of packing it for shipment, and the results from a large number of inoculations are given in detail.—*B. B. Higgins*.

1574. GODFREY, G. H., AND R. B. HARVEY. Motion pictures of zoospore production in *Phytophthora*. *Phytopathology* 11: 145-146. Pl. 6. 1921.

1575. TILLEY, F. W. Phenol coefficients. *Amer. Jour. Public Health* 11: 513-519. 1921.—Phenol coefficients vary with the source of peptone used and with the hydrogen-ion concentration of the culture tested. They also vary with different organisms. The coefficients are determined in the absence of organic matter and so are of little value where the disinfectants are intended for use in its presence. Disinfectants should be tested under conditions simulating as closely as possible those under which they are to be used. It is more important to determine effective concentrations than to determine phenol coefficients.—*C. A. Ludwig*.

1576. VILLEDIEU, G., ET MME. [VILLEDIEU.] De la non-toxicité du cuivre pour le mildiou. [Concerning the non-toxicity of copper for mildew.] *Compt. Rend. Acad. Sci. Paris* 172: 335-336. 1921.—A very delicate test for copper is developed by using 100 cc. of a solution containing 2 drops of potassium ferrocyanide and 4 drops of acetic acid. By this test it is found that copper is not involved in the toxic effect of various solutions applied to fungi.—*C. H. Farr*.

PHARMACEUTICAL BOTANY AND PHARMACOGNOSY

HEBER W. YOUNGKEN, *Editor*

E. N. GATHERCOAL, *Assistant Editor*

(See also in this issue Entries 1107, 1113, 1182, 1196, 1197, 1198, 1202, 1205, 1207, 1210, 1211, 1256, 1682)

1577. ANONYMOUS. Jalap production in Mexico. *Pharm. Era* 53: 75-76. 1 fig. 1920.—Temporary cessation in the production of Jalap is due to the earthquake of January 3, which

destroyed whole villages in the state of Vera Cruz where most of the drug is obtained. Jalap is collected, for the most part, from wild-growing plants, but has been cultivated successfully in India and Jamaica. Various other species of *Ipomoea* are used as substitutes for the true Jalap.—C. M. Sterling.

1578. ANONYMOUS. Malayan drug venders in the East Indies. Pharm. Era 53: 263-264. 1 fig. 1920.

1579. ANONYMOUS. New botanical drugs sought. Pharm. Era 53: 321-324. 3 fig. 1920.—A staff correspondent account of the H. K. Mulford expedition to South America, conducted by Dr. RUSBY.—C. M. Sterling.

1580. ANONYMOUS. U. S. Pharmacopoeial Convention. Druggists Circ. 64: 225-229. 1920.—An account is given of the proceedings of the convention in Washington, D. C., for the 10th decennial revision of the United States Pharmacopoeia, of Dr. WILEY's presidential address, and selection of the committee of revision.—C. M. Sterling.

1581. BALLARD, C. W. The identification of gums by the phenyl hydrazine reaction. Amer. Druggist and Pharm. Rec. 68^s: 28-30. Fig. 1-14. 1920.

1582. BERGER, J. B. "Starch count constants": Their determination and value. Pacific Pharm. 12: 6-9. 1918.—Methods of procedure are given in making quantitative estimates of different starches, and the application of such estimates in food and drug analysis.—C. M. Sterling.

1583. BLOKZEYL, K. R. F. The cinchona industry in Java. Pharm. Era 53: 69-73. 5 fig. 1920.—An account is given of the introduction of *Cinchona* into southern Asiatic countries and its cultivation in Java. More than 20 species have been described.—Cultivation is most successful at an elevation of about 5000 feet and a temperature of 16-17°C. Seedlings, about 6 months old, grown from seeds of specially selected, superior trees are taken from the nursery beds and transplanted to larger beds. When the trees are 2-3 feet in height they are planted in the gardens. Propagation by grafting is also practiced.—For the most part bark is harvested by removing long, vertical strips and covering the denuded parts with moss, or by cutting down the trees to stumps of a certain height in order to let them renew their stems by fresh buddings. Bark for pharmaceutical purposes is removed in large sections and carefully prepared and rolled into "pipes," but bark used for the manufacture of quinine salts is scraped off after it has been beaten with wooden hammers. Drying is done in the sun as far as possible, but artificial drying at 100°C. is used to remove 10-15 per cent of moisture not removable at air temperature. Alkaloids are found in all parts of the plant, but principally in the parenchyma of the outer cortex. About 90 per cent of the world's production of *Cinchona* bark comes from Java. Until 1913, *Cinchona* bark was sold in Amsterdam at public auction, but in recent years England, the U. S. A., and Japan have been the largest buyers.—C. M. Sterling.

1584. FARWELL, O. A. The identity of commercial Blue Flag. Amer. Druggist and Pharm. Rec. 67: 29. 1919.

1585. FISCHER, HANN. Heilpflanzen und Siedlung. [Medicinal plants and colonization.] Pharm. Zentralhalle 61: 279-281. 1920.—The cultivating and gathering of medicinal plants were neglected before the war. Germany was largely dependent on domestic drugs during the war and the author emphasizes the need for continuing domestic collecting and suggests that medicinal plants be cultivated wherever opportunity allows.—H. Engelhardt.

1586. GRANT, E. H. New tests for some purgative drugs. Pharm. Era 53: 295-296. 1920.

1587. GRIEBEL, C., UND A. SCHÄFER. Majoranpulververfälschung durch Bohnenkraut. [Imitation of marjoram powder by summer savory.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 39: 299-300. 1920.—Morphological distinctions between the two are described with illustrations.—H. G. Barbour.

1588. GUNN, J. W. C. The action of *Urginea Burkei* (Baker). Trans. Roy. Soc. South Africa 9: 197-204. 5 fig. 1921.—The results of a large number of experiments show that *Urginea Burkei* (Baker), the Transvaal Slang Kop, has the same actions as the digitalis bodies. It is suggested that it might possibly be used as a South African substitute for squills.—E. M. Doidge.

1589. GUPTA, S. N. Coffee and its antiseptic value. Pacific Pharm. 12: 57-59. 1918.

1590. HAMILTON, HERBERT C. Interesting features of *Digitalis*. Pharm. Era 53: 103-104, 134-136. 1920.

1591. HERZFELD, H. *Ilex paraguensis* or La Yerba Mate. Pharm. Era 53: 353-354. 1920.—The origin, history, preparation, physiological effects, chemical composition, and therapeutic indications of this beverage commonly used by all classes of South Americans are recounted.—C. M. Sterling.

1592. HUMPHREY, N. The cultivation of medicinal plants. Gard. Chron. 69: 175. 1921.—The author reviews a paper read before the North British Branch of the Pharmaceutical Society of Great Britain by R. GLADE GUYER. A medicinal plant farm was started at Narriston, Edinburgh, in 1915 by Duncan, Plockharr and Company, where aconite, belladonna, colchicum, foxglove, henbane, poppies, roses, stramonium, and valerian are grown commercially and experiments have been conducted with broom, calendula, dandelion, elder, and veratrum. Notes are given on a few of these plants.—P. L. Ricker.

1593. KEBLER, LYMAN F. Suggested changes in the U. S. Pharmacopoeia. Druggists Circ. 63: 483-485. 1919.

1594. KOCH, FELIX J. Interesting differences between the familiar pie-plant of the markets and the medicinal herb from over-seas. Amer. Druggist and Pharm. Rec. 68¹: 42-46. 1920.

1595. KOCH, FELIX J. Raising ginseng in Kentucky. Amer. Druggist and Pharm. Rec. 67¹¹: 36. 1919.

1596. KREMERS, EDWARD. Problems in plant chemistry. Pharm. Era 63: 325-326. 1920.—Problems presented to the author by the cultivation and working up of medicinal plants on a large scale are discussed.—C. M. Sterling.

1597. KRYZ, F. Ein Beitrag zur Kenntnis der Farbstoffe der Hagebutten, der Hollunderbeeren und verwandter Beeren. [Coloring matter of hip, elder, and related berries.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 38: 364-366. 1919.—The author describes the chemical characteristics of these colors.—H. G. Barbour.

1598. MCNAIR, JAMES B. The transmission of *Rhus* poison from plant to person. Amer. Jour. Bot. 8: 238-250. 1921.—The author reviews in some detail the previous literature on the subject. He then describes a series of experiments which indicate that the poison of *Rhus diversiloba* is not volatile, since (a) it is not distillable, (b) the smoke of the burning plant is not poisonous when filtered, (c) emanations from uninjured leaves are not poisonous, (d) dermatitis occurs only on those points on the skin where the sap has been applied, (e) the poison does not diffuse rapidly in the skin, and (f) the period of latency is too long. The author concludes that the poison is confined exclusively to the resinous sap. Malignancy of the leaf decreases on drying. Poisoning without contact with the plant may occur from the

smoke of the burning plant or by contact with substances that have the poisonous sap on them.
—E. W. Sinnott.

1599. MAIDEN, J. H. The larkspurs as poisonous plants. Agric. Gaz. New South Wales 32: 326. 1921.—The article briefly reviews our knowledge of Delphiniums toxic to mammals and insects.—L. R. Waldron.

1600. NESTLER, A. Über den Nachweis von Rhinanthin im Mehl. [Identification of rhinanthin in flour.] Zeitschr. Untersuch. Nahrungs- u. Genussmittel 39: 41-44. 1920.—Rhinanthin is a glucoside from seeds of *Alectorolophus hirsutus* and *Melampyrum arvense* with which meal may be adulterated, producing a blue or blue-green color in the presence of acid. The result is known as "blue bread." Hydrochloric acid (5-10 per cent) is used in the identification test described.—H. G. Barbour.

1601. PETRIE, J. M. Cyanogenesis in plants. Part IV. The hydrocyanic acid of *Heterodendron*—a fodder plant of New South Wales. Proc. Linn. Soc. New South Wales 45: 447-459. 1920.—*Heterodendron oleaeifolia* Def. (Sapindaceae), an endemic Australian evergreen tree or large shrub, has been much used for cattle feeding during drought, and many deaths have resulted. It is popularly known as rosebush, whitewood, rosewood, western rosewood, emubush, cabbagebush, boonery tree, dogwood, ironwood, bluebush, and bullockbush without reference to the application of these names elsewhere. It was found to contain a cyanogenetic glucoside yielding, when hydrolyzed, 0.328 per cent of hydrocyanic acid. It is therefore one of the most poisonous cyanogenetic plants known, yielding more than twice as much hydrocyanic acid as bitter almonds. One ounce of the air-dried leaves forms a lethal amount for 1 sheep. The leaves are invariably found to be deficient in enzyme, and require the addition of emulsin to bring about the complete decomposition of the glucoside. The foliage of the wild orange, *Capparis Mitchellii* Lindl. (Capparidaceae), was also found to be cyanogenetic; this is thought to be the 1st record in this family. Several of the Sapindaceae have been shown to be cyanogenetic, including *Ungnadia speciosa* Endl. of Mexico and Texas.—Eloise Gerry.

1602. PETRIE, J. M. The chemical examination of *Macrozamia spiralis* Miq. Proc. Linn. Soc. New South Wales 45: 424-442. 1920.—This cycad grows abundantly along the east coast of New South Wales and has been regarded as a poisonous plant from the earliest days of the colony. A summary of its poisonous record is given including many instances where it was fatal to stock. The chemical composition of its leaves is characterized by a large amount of amorphous resins. The following constituents were identified: Formic, acetic, valeric, and lauric acids, also oleic, stearic, and higher fatty acids, and a very volatile essential oil; a phytosterol (melting point 132°C., optical rotation -34.5, melting point of acetate, 120°C.); a paraffin, with the properties of triacontane, C₃₀H₆₂; and an olefine having the properties of octodecylene. The nuts contained 39 per cent of starch and much mucilage. In feeding experiments, white rats were given, with their ordinary food, (1) the crushed fresh leaves, (2) the grated seeds, (3) the rich, fatty, resinous components extracted from the leaves by ether (which Dr. LAUTERER stated contained the poisonous principle), and (4) the aqueous extract of the leaves and the seeds (by which the aborigines believed the poison was removed). The animals showed no signs of being affected after 3 weeks' feeding. The material was apparently not poisonous to white rats and no active poison principle was isolated or identified. With careless feeding, however, the animals are easily killed by impaction, which is due to the fibrous nature of the material.—Eloise Gerry.

1603. PHILLIPS, E. P. The genus *Bersama*. Bothalia 1: 33-39. 1921.—The genus *Bersama* was monographed by E. G. BAKER (Jour. Bot. 45: 12. 1907) and 2 species were described from South Africa. The interest in the various species was first aroused by Mr. C. C. Robertson, M. F., who sent samples of the bark to the Imperial Institute for examination, as it was reported that the natives use the bark medicinally. Under the name *B. tysoniana* 3 species have been included, *B. tysoniana*, *B. Swinnyi*, and *B. Stayneri*. The bark of all is used medicinally by the natives.—E. P. Phillips.

1604. RUSBY, H. H. Suggestions for the revision of the pharmacopoeia. *Druggists Circ.* 64: 123-126. 1920.

1605. RUSBY, H. H. Suggestions for the revision of the United States Pharmacopoeia. *Amer. Druggist and Pharm. Rec.* 68³: 24-30. 1920.

1606. RUSBY, H. H. The H. K. Mulford Biological Expedition. *Druggists Circ.* 64: 425-426. 1920.—A biological expedition, sponsored by the H. K. Mulford Co., in charge of Dr. Rusby will visit the upper Amazon valley, reaching southeastern Colombia and north-western Brazil. The object is to investigate the medicinal plants of the region, but a study of the insects and reptiles abounding in the region will be undertaken by specialists and the fishes of the Amazon will receive especial attention. It is expected that the expedition will be isolated from civilization for about 6 months.—*C. M. Sterling.*

1607. SCHNEIDER, ALBERT. Pharmaceutical research. *Druggists Circ.* 65: 163-165. 1921.—The author discusses research and its necessity in pharmacy. A plan for the development of research in pharmacy and related subjects is presented.—*C. M. Sterling.*

1608. SEEL, E. Beiträge zur Kenntnis der Chemie und Pharmakologie der Aloe. [*Chemistry and pharmacology of aloes.*] *Arch. der Pharm.* 257: 212-259. 1919.—The important constituents of aloes are given as: (1) Water-soluble crystalline aloin; (2) water-soluble amorphous aloetin; (3) resinous portion (insoluble in cold water); and (4) emodin (methyltrioxyanthraquinone or oxymethylidioxyanthraquinone). Detailed chemical analyses are given. 0.5-2.0 gr. of the puraloin (oxidation products of aloin) were found to give a mild purgative effect in children and dogs, but this was not dependable. The reliability of emodin as a cathartic in doses of 0.2-0.4 gr. at 3-hour intervals is confirmed. Oxyemodin is somewhat weaker, 0.5 gr. often being required. Like emodin it can be injected hypodermically. The only important effect of oxidizing aloe constituents with sodium peroxide appears to have been the purification of emodin itself.—*H. G. Barbour.*

1609. STOCKBERGER, W. W. Commercial drug growing in the United States in 1918. *Amer. Druggist and Pharm. Rec.* 68²: 17-18. 1920.—Recent work to obtain marketable quantities of Belladonna, Cannabis, Digitalis, Calendula, sage, and henbane is reviewed.—*C. M. Sterling.*

1610. STOCKBERGER, W. W. Crude drug situation in the United States. *Western Druggist* 43: 21-24. 1921.—The author reviews the crude drug supplies in the U. S. A. at the close of the World War. By way of improvement he suggests cultivation of plants in medicinal gardens, and the cooperation of state schools of pharmacy, botanists, high school teachers, and county agents in compiling information concerning the drug resources of the states.—*C. M. Sterling.*

1611. SWANSON, C. O. Hydrocyanic acid in Sudan grass and its effect on cattle. *Jour. Amer. Soc. Agron.* 13: 33-36. 1921.—Sudan grass giving a strong test for HCN was not harmful to cattle. Liberation of HCN from Sudan grass is apparently associated with enzyme action. Slow drying causes HCN to disappear. The amount of HCN obtained was not diminished when Sudan grass was made into silage. Frosted Sudan grass, when tested immediately, gave very large amounts of HCN which rapidly disappeared when the plant wilted.—*F. M. Schertz.*

1612. WALLACE, EMMA GARY. Some facts concerning camphor farming. *Pharm. Era* 53: 261-262. 1 fig. 1920.—An account of recent plans to furnish native-grown camphor for the American market is given.—*C. M. Sterling.*

1613. WATERMEYER, F. W. American liquid styrax. *Amer. Druggist and Pharm. Rec.* 68²: 20. 1920.—American styrax, obtained from *Liquidambar styraciflua*, has been collected from large forests of trees located in Honduras. The species occurs in the southern states also, but in relatively small quantities. For many purposes the American styrax is superior to

the Asiatic and will probably be in demand when normal supplies of Asiatic styrax are again available.—*C. M. Sterling.*

1614. WHITE, F. ASHFORD. A glimpse of Grasse, the home of the French perfumery industry. *Amer. Druggist and Pharm. Rec.* 68^o: 18-20. 7 fig. 1920.

PHYSIOLOGY

B. M. DUGGAR, *Editor*

CARROLL W. DODGE, *Assistant Editor*

(See also in this issue Entries 1258, 1291, 1323, 1341, 1386, 1497, 1409, 1410, 1415, 1419, 1481, 1490, 1492, 1495, 1539, 1611, 1664)

DIFFUSION, PERMEABILITY, ADSORPTION

1615. LOEB, JACQUES. Ionic radius and ionic efficiency. *Jour. Gen. Physiol.* 2: 673-687. 1920.—The writer has previously demonstrated that when solutions of electrolytes are separated from water by membranes, the ions with the same sign as that of the membrane increase while ions of opposite sign decrease diffusion of water through the membranes, and that the effects of these ions increase with an increase in valency. Aside from valency the so-called ionic radius, the distance between the central positive nucleus and the outermost ring or shell of electrons, also influences the rate of water diffusion. It is shown in this paper that the accelerating and depressing effects of anions increase directly with the order of magnitude of their radii in the order $Cl < Br < I$, while these effects of cations increase inversely as the radii in the order $Rb < K < Na < Li$. This is explained on the assumption that the action of ions is electrostatic. The effect of the extra positive charge on the nucleus of a cation, therefore, will be greater the smaller the radius, while the effect of the excess electron of the anion will be greater the greater its distance from its own positive nucleus. It is suggested that a similar explanation might be adjusted to apply to polyatomic ions.—*Otis F. Curtis.*

1616. LOEB, JACQUES. The reversal of the sign of the charge of collodion membranes by trivalent cations. *Jour. Gen. Physiol.* 2: 659-671. 1920.—The writer gives evidence to show that a collodion membrane treated with protein becomes positively charged when in contact with salts of trivalent cations. This reversal of charge is similar to that induced by acid (see Bot. Absts. 8, Entry 607). The reversal of the charge induced by trivalent cations, however, occurs on the alkaline side of the isoelectric point of the protein. Collodion membranes not treated with protein can not be induced to assume a positive charge by treatment with either trivalent cations or acid.—*Otis F. Curtis.*

WATER RELATIONS

1617. HOTTES, C. F. A constant humidity case. [Abstract.] *Phytopath.* 11: 51. 1921

MINERAL NUTRIENTS

1618. ANONYMOUS. Disintegration of roofing tile. *Sci. Amer. Monthly* 3: 244. 1921.—The contributor quotes J. SCOTT (*British Clay Worker* 29: 138-140. 1920) to the effect that *Mucor racemosus* attacks roofing tile and thus obtains part of its food, causing the tile to disintegrate.—*Chas. H. Otis.*

1619. DICKSON, JAMES GEERE. The relation of certain nutritive elements to the composition of the oat plant. *Amer. Jour. Bot.* 8: 256-274. 2 fig. 1921.—The effect of limiting certain essential nutrient elements upon the chemical composition of the plant was studied. Pedigreed Swedish oats, *Avena sativa aristata*, were grown in sand cultures watered by nutrient solutions. The latter consisted of a modified Knop's solution (as a control) and 5 other modified solutions, in each of which 1 of the elements magnesium, calcium, potassium, phosphorus,

and nitrogen was reduced to $\frac{1}{10}$ of the quantity present in the normal solution. Plants were grown to maturity in each case. The calcium content of both grain and straw is reduced to about 10 per cent of that in the controls by reducing the calcium in the culture solution to $\frac{1}{10}$ the quantity in the complete solution. It is greatly reduced in both grain and straw by a similar deficiency in phosphorus or nitrogen. By reducing the phosphate in the culture solution to $\frac{1}{10}$ of the quantity in the complete solution used as control, the total phosphorus content of the grain is thereby reduced to 46 per cent and that of the straw to 10 per cent of the quantity found in the complete solutions. It is slightly reduced in both grain and straw by a similar deficiency in potassium, and is increased by a similar reduction of calcium or nitrogen. Variations in composition are more pronounced in straw, but in general are similar in both grain and straw. The phosphorus content of both grain and straw is modified by seasonal differences except in phosphorus-deficient solutions. The calcium content of the grain is modified by seasonal differences even in calcium-deficient solutions. The calcium content of the straw shows no consistent response to climate.—*E. W. Sinnott.*

1620. ESPINO, R. B. A preliminary study of the mineral nutrition of young cotton plants. *Philippine Agric. Rev.* 13: 335-343. 1920.

1621. HOWE, H. E. Some of the new applications of sulfur in agriculture. *Sci. Amer.* 124: 392. 1921.—This is a condensation of an article by J. G. LIPMAN in a recent issue of the *Chemical Age*.—*Chas H. Otis.*

1622. MEIER, HENRY F. A., AND CLIFTON E. HALSTEAD. Hydrogen-ion concentration relations in a three-salt solution. *Soil Sci.* 11: 325-351. *Pl. 1, 9 fig.* 1921.—Fulcaster wheat was grown for a period of 35 days in water cultures containing potassium dihydrogen phosphate, calcium nitrate, and magnesium sulphate in varying proportions and having a total osmotic value of 1 atmosphere. The solutions were changed at 3-day intervals and the hydrogen-ion concentration determined at each change. No one combination of the 3 salts gave constantly a maximum yield of tops, roots, or total dry weight in the 3 sets grown at different periods. The cultures giving maximum dry weights exhibited minimum water requirements. The hydrogen-ion concentration of acid solutions in which the wheat was grown tended to approach neutrality. There was no apparent correlation between the yield of the plant and the hydrogen-ion concentration, or change in hydrogen-ion concentration. Those degrees of acidity which are just harmful to *Actinomyces* and *Azotobacter* have no visible effect on wheat.—*W. J. Robbins.*

1623. TRELEASE, S. F., AND P. PAULINO. The effect on the growth of rice of the addition of ammonium and nitrate salts to soil cultures. *Philippine Agric. Rev.* 13: 293-313. 1920.—The highest yields were secured when nitrogen was supplied as ammonium sulphate, the next higher in order being with nitrate—calcium nitrate and sodium nitrate.—*E. D. Merrill.*

PHOTOSYNTHESIS

1624. YAP, G. G. A study of the photosynthesis of sugar cane. *Philippine Agric.* 8: 269-276. 1920.—The general conclusions are as follows: The rate of photosynthesis decreased from 10 in the morning to 4 in the afternoon, the leaves being most active from 8 to 10 in the morning; young leaves are more active than old ones; the rate of respiration was apparently less than $\frac{1}{2}$ that of photosynthesis; high light intensity probably has an indirect relation to the rate of photosynthesis, tending to decrease photosynthetic activity.—*E. D. Merrill.*

METABOLISM (GENERAL)

1625. DELAUNEY, P. Nouvelles recherches concernant l'extraction des glucosides chez quelques orchidées indigènes: identification de ces glucosides avec la loroglossine. [The extraction of glucosides from certain indigenous orchids and the identification of these glucosides with loroglossin.] *Compt. Rend. Acad. Sci. Paris* 172: 471-473. 1921.—The glucoside, lora-

glossin, is now found in 3 other orchids besides in the 2 previously reported [see also Bot. Absts. 8, Entry 582].—C. H. Farr.

1626. FULMER, ELLIS I., VICTOR E. NELSON, AND F. F. SHERWOOD. The nutritional requirements of yeast. I. The role of vitamins in the growth of yeast. Jour. Amer. Chem. Soc. 43: 186-191. 1921.—This paper presents data showing that water soluble B is not a necessary constituent of a medium for the growth of yeast.—J. M. Brannon.

1627. KOHLER, DENISE. Variation des acides organiques au cours de la pigmentation anthocyanique. [Variation in the organic acids during the formation of anthocyan pigments.] Compt. Rend. Acad. Sci. Paris 172: 709-711. 1921.—This is a study of anthocyan formation in the corolla of *Cobaea scandens*, the leaves of *Ampelopsis tricuspidata*, etc. An increase in organic acids was found in all cases in which the part of the plant experimented on was left attached to the plant; but no such increase occurred if the part was detached. In buckwheat leaves more acids are formed in darkness than in light.—C. H. Farr.

1628. LOEB, JACQUES. La chimie des protéines et des colloïdes. [The chemistry of proteins and colloids.] Rev. Gén. Sci. Pures et Appl. 32: 197-202. 1921.—This is a translation by G. Loewy and W. Westrejat of an article appearing in Science 52: 449-456. 1920.—H. W. Anderson.

1629. POSTERNAK, S. Sur la constitution chimique et la synthèse du principe phosphoorganique de réserve des plantes vertes. [Chemical composition and synthesis of the phosphoorganic reserve substance in green plants.] Compt. Rend. Soc. Phys. et Hist. Nat. Genève 37: 70-74. 1920.—The compound often designated phytic acid has never been found outside of green plants, where it occurs in seeds, tubers, rhizomes, and bulbs. It is found in the aleurone layer as a double salt of calcium and magnesium; also in the oily seeds of *Picea excelsa*, *Cannabis sativa*, and *Cucurbita pepo*. The investigation of the compound is made possible by the discovery of the crystallizable double salt $C_6H_{12}O_{27}P_6Ca_4Na_8$. The free acid is found to have the composition $C_6H_{24}O_{27}P_6$, which upon hydrolysis splits up thus: $C_6H_{24}O_{27}P_6 + 3H_2O = C_6H_{12}O_6 + 6H_3PO_4$, the reaction pointing toward the substance being inositehexaphosphoric ether of the formula $C_6H_{12}O_{24}P_6$. The substance, however, differs from the latter in having the equivalent of 3 additional molecules of water of constitution, which cannot be driven off without decomposing the material. The synthesis of inositehexaphosphoric ether shows, however, that it is indeed identical with the substance in question, and possesses the peculiarity of retaining 3 molecules H_2O so firmly as to resist dehydration without the attendant decomposition.—Charles Drechsler.

METABOLISM (ENZYMES, FERMENTATION)

1630. BATTELLI, F., ET L. STERN. Oxydations et réductions fermentatives. [Oxydations and reductions by enzymes.] Comp. Rend. Soc. Phys. et Hist. Nat. Genève 37: 65-68. 1920.—The author investigated the plausibility of WIELAND's views concerning the action of oxydases in biological oxidations, according to which these behave like platinum black, activating the hydrogen of reducing substances, and transferring it to substances combining with the latter. This theory rests on the hypothesis that oxidations and reductions are effected by the same enzymes. The author also studied the action of oxydases known to be present in the tissue of higher animals on compounds oxidized by them, in the presence of thionine. The oxydases of citric acid, succinic acid, phenylenediamine, uric acid, and alcohol were thus investigated. The results were held to confirm Wieland's hypothesis of the identity of oxydases and reductases; but they indicated, too, that his hypothesis concerning the mechanism of oxidations was wrong, this being explained better by a modification of Traube's theory modernized by the introduction of a knowledge of ionization.—Charles Drechsler.

1631. EPSTEIN, ALEXANDRE. L'activité d'un ferment en fonction de la tension superficielle du milieu. [The activity of an enzyme in relation to surface tension of medium.] Compt.

Rend. Soc. Phys. et Hist. Nat. Genève 37: 74-79. 1920.—Investigating the relation of the surface tension of a medium containing an enzyme to its activity, the author studied the activity of tyrosinase in the presence of increasing concentrations of monovalent alcohols. It was found that whatever alcohol was used, solutions of equal surface tensions produced comparable results, the maximum stimulation occurring at surface tension 70, and the post-optimum decline becoming more gradual with increase in the length of the carbon chain. Comparing the effect of alcohol with that of ether, chloroform, and acetone, the author concludes that the hydroxyl group has a weak inhibitory effect on tyrosinase. The activity of tyrosinase in the presence of alcohol is then the resultant of the stimulating effect induced by lowering the surface tension, of the depressing effect of the hydroxyl group, and of the retarding influence arising from the displacement of the enzyme by the alcohol at the surface of the two phases.—*Charles Drechsler.*

1632. GREIG-SMITH, R. Ropiness in wattle bark infusions. Proc. Linn. Soc. New South Wales 45: 52-89. Pl. 9. 1920.—Ropiness is often encountered in tanning liquors and there may be many causative organisms. This study was made on wattle bark infusions only, but the results are considered applicable to tanning liquors. Two closely allied bacteria, designated A and B, were isolated. They caused mucinous fermentation of bark infusions and of synthetic media containing sugar. The chemistry of the reactions and products is discussed. Information obtained from tanners on the occurrence of ropiness in other than wattle bark liquors is appended.—*Eloise Gerry.*

1633. HÉRISSEY, H. Sur l'hydrolyse du méthyl-d-mannoside α par les ferments solubles. [The hydrolysis of methyl-d-mannoside α by soluble ferments.] Compt. Rend. Acad. Sci. Paris 172: 766-768. 1921.—Germinating seeds of lucerne are shown to contain d-mannosidase.—*C. H. Farr.*

1634. MUELLER, EDWARD. The chemistry of enzyme actions. [Rev. of: FALK, K. GEORGE. The chemistry of enzyme action. 136 p. Chemical Catalogue Company: New York, 1921.] Amer. Jour. Public Health 11: 546. 1921.

1635. NORTHROP, JOHN H. The influence of the substrate concentration on the rate of hydrolysis of proteins by pepsin. Jour. Gen. Physiol. 2: 595-611. 1920.—It is pointed out that the apparent exceptions to the law of mass action found in enzyme reactions may be found in catalytic reactions in strictly homogeneous solutions.—These deviations in the rate of reaction from the law of mass action may be explained by the hypothesis that the active mass of the reacting substances is not directly proportional to the total concentration of substance taken.—In support of this suggestion it is shown that for any given concentration of pepsin the relative rate of digestion of concentrated and of dilute protein solutions is always the same. If the rate of digestion depended on the saturation of the surface of the enzyme by substrate the relative rate of digestion of concentrated protein solutions should increase more rapidly with the concentration of enzyme than that of dilute solutions. This was found not to be true, even when the enzyme could not be considered saturated in the dilute protein solutions.—The rate of digestion and the conductivity of egg albumin solutions of different concentration were found to be approximately proportional at the same PH. This agrees with the hypothesis first expressed by PAULI that the ionized protein is largely or entirely the form which is attacked by the enzyme.—The rate of digestion is diminished by a very large increase in the viscosity of the protein solution. This effect is probably a mechanical one due to the retardation of the diffusion of the enzyme.—*Author's summary.*

1636. SCHMITZ, HENRY. Enzyme action in *Echinodontium tinctorum* Ellis and Everhart. Jour. Gen. Physiol. 2: 613-616. 1920.—Mats of the tissue of *Echinodontium tinctorum*, a destructive wood-destroying fungus, which had grown for 3 months in pure culture on sliced carrots, were dried and powdered. Tests showed the presence of the following enzymes: Esterase, maltase, lactase, sucrase, raffinase, diastase, inulase, cellulase, hemicellulase,

urease, rennet, and catalase. Tests for the presence of amidase, tannase, proteases, also esterases acting on olive oil emulsion, and triacetin showed negative results.—*Otis F. Curtis.*

1637. WEISS, FREEMAN, AND R. B. HARVEY. Catalase, hydrogen-ion concentration and growth in the potato wart disease. [Abstract.] *Phytopath.* 11: 57-58. 1921.

METABOLISM (RESPIRATION)

1638. ANONYMOUS. Gaseous exchanges between plant roots and the air. *Sci. Amer. Monthly* 3: 217. 1921.—This is a brief report of the results of the experiments of M. RAOUL CERIGHELLI (see Bot. Absts. 8, Entry 652).—*Chas. H. Otis.*

1639. GUSTAFSON, F. G. Comparative studies on respiration. II. The effect of hydrogen ion concentration on the respiration of *Penicillium chrysogenum*. *Jour. Gen. Physiol.* 2: 617-626. 1920.—For the most part measurements were taken of the time necessary to produce a given amount of CO₂, though in a few cases oxygen absorption was measured. Considering respiration in a neutral solution as normal, changes in concentration between P_H 4-8 had practically no effect on the normal rate. Decreasing the P_H value to 2.65 caused a gradual rise followed by a gradual return to normal, while at P_H 1.10-1.95 the preliminary rise of about 20 per cent was followed by a fall to below normal within 60 minutes. Increasing the P_H value to 8.80 resulted in a decrease in respiration to 60 per cent of the normal. The decrease in respiration due to a P_H value of 1.95 or less was not reversible, while a similar decrease in rate which occurred at 8.80 was reversible.—*Otis F. Curtis.*

1640. NICOLAS, M. G. Contribution a l'étude des relations qui existent, dans les feuilles, entre la respiration et la présence de l'anthocyane. [Relations between respiration and the presence of anthocyan in leaves.] *Rev. Gén. Bot.* 31: 161-178. 1919.—The author cites some literature, the evidence from which indicates that there is a relation, though not a direct one, between the presence of oxygen and the occurrence of red, blue, and similar pigments found in fruits and flowers.—Of 2 plants belonging to the same species, one of which is red and the other green, the former possesses fewer chloroplasts, manufactures less carbohydrate, and so exhibits a less intense gaseous exchange. There is apparently a greater fixation of oxygen in the red leaves than in the green. Where acids accumulate, there is a decrease in respiratory intensity. The acids are the result of the incomplete oxidation of sugar, and the red color depends on the formation of these acids. This accounts for the apparent necessity of oxygen in the production of the red color.—*J. M. Brannon.*

ORGANISM AS A WHOLE

1641. FULMER, ELLIS I., VICTOR E. NELSON, AND F. F. SHERWOOD. The nutritional requirements of yeast. II. The effect of the composition of the medium on the growth of yeast. *Jour. Amer. Chem. Soc.* 43: 191-199. 1921.—The following is the medium which the authors find best for the growth of yeast: 100 cc. of the medium contains 0.188 gr. of ammonium chloride, 0.100 gm. of dipotassium phosphate, 0.040 gr. of precipitated calcium carbonate, 0.60 gr. of dextrin, and 10 gr. of cane sugar. The authors think it possible that such a colloidal material as dextrin protects the yeast against poisonous substances.—*J. M. Brannon.*

1642. HOPKINS, E. F. Hydrogen-ion concentration of the soil and seedling infection by *Gibberella saubinetii*. [Abstract.] *Phytopath.* 11: 36-37. 1921.

GROWTH, DEVELOPMENT, REPRODUCTION

1643. HOPKINS, E. F. Growth and germination of *Gibberella saubinetii* at varying hydrogen-ion concentrations. [Abstract.] *Phytopath.* 11: 36. 1921.

1644. K[ENOYER], L. A. [Rev. of: GARNER, W. W., AND H. A. ALLARD. Effect of the relative length of day and night and other factors on growth and reproduction in plants. Jour. Agric. Res. 18: 553-605. 1920 (see Bot. Absts. 5, Entry 22).] Jour. Indian Bot. 2: 92. 1921

1645. MASON, T. G. A note on poling in some fibre agaves. Agric. News [Barbados 20: 84. 1921.—“The longevity of the plant and the number of years throughout which the crop can be secured, is of course decided by the number of years the plant passes in the purely vegetative state before poling and dying.” Premature poling might render the cultivation of fiber-agaves impossible since it would not allow the planter sufficient time to recover his expended capital. An experiment with agave planted from bulbils was started in Montserrat in September, 1902. Instead of a 4-year period, the leaves were ready for reaping in 2 years, and by 1907, 25 per cent of the plants had poled. Apparently the whole life cycle of the plants was accelerated; 4 good crops had, however, been produced before the plants were dug out. After a reference to the kind of soil and climatic conditions best suited to the cultivation of agaves, the author concludes by pointing out the necessity for experimentation to determine the factors influencing premature poling.—J. S. Dash.

1646. SCHAFFNER, J. H. Reversal of the sexual state in certain types of monoecious inflorescences. Ohio Jour. Sci. 21: 185-200. Pl. 1-2. 1921.—A list is given of common plants in which a complete change from one sexual state to the other takes place in the inflorescence. A detailed study of 7 species shows the character of the morphological expressions on the transition zone between tissues in a male state and those in a female state. Maleness and femaleness in plants are shown to be quantitative, reversible states arising during vegetative growth from neutral states. It is thought that sex can be controlled and changed from one state to another.—H. D. Hooker, Jr.

MOVEMENTS OF GROWTH AND TURGOR CHANGES

1647. COUPIN, HENRI. Sur une tige à géotropisme horizontal. [A stem which displays horizontal geotropism.] Compt. Rend. Acad. Sci. Paris 172: 608-610. 1921.—If seedlings of certain lentils are grown in darkness, the stems assume a horizontal position; if placed upright, they curve over to the horizontal again. They thus display a plagiotropism. If illuminated equally on all sides, they show ordinary negative geotropism.—C. H. Farr.

TEMPERATURE RELATIONS

1648. BERTRAND, GABRIEL, ET ARTHUR COMPTON. Influence de la chaleur sur l'activité de la salicinase. [The influence of temperature on the activity of salicinase.] Compt. Rend. Acad. Sci. Paris 172: 548-551. 1921.—It was found that for salicinase of almond the lethal and optimum temperatures are decreased as the duration of exposure to the temperature is increased. The maximum temperature at which activity takes place is the same as the temperature of instantaneous destruction of the enzyme.—C. H. Farr.

TOXIC AGENTS

1649. NOBÉCOURT, PIERRE. Action de quelques alcaloïdes sur le *Botrytis cinerea* Pers. [The effect of certain alkaloids on *Botrytis cinerea*.] Compt. Rend. Acad. Sci. Paris 172: 706-708. 1921.—The basis of immunity in plants is often attributed to the presence of alkaloids, or related products, in the tissues of the host. *Botrytis cinerea* was chosen for this study because it is parasitic on so many plants, including *Nicotiana*, *Cinchona*, and *Atropa belladonna*, as well as other plants which are high in alkaloids. Such alkaloids as atropine, nicotine, aconitine, and quinine sulphate were used with this fungus and these showed no toxic effects at concentrations greater than those commonly occurring in the host plants.—C. H. Farr.

1650. OSTERHOUT, W. J. V. The mechanism of injury and recovery. Jour. Gen. Physiol. 3: 15-20. 1920.—During the changes leading to injury or death the resistance of many tissues to the passage of an electric current is altered, and this change in conductivity, since it can

be accurately determined, has been used by the writer as a measure of injury or recovery. It is assumed that the conductivity of the tissue of *Laminaria Agardhii* as found in sea water is normal and that a change in conductivity may be used as a measure of injury or recovery. The writer then exposed such tissues to certain solutions affecting permeability (of the same conductivity as sea water) for short periods. Upon returning them to sea water there was complete recovery. When exposed for longer periods recovery was only partial, indicating permanent injury. The writer's conception is that recovery is not a reversal of the reactions which produce injury, but that the reactions involved are practically irreversible and that injury and recovery differ only in the relative speed at which certain steps take place in a series of reactions which progress chiefly in one direction.—*Otis F. Curtis.*

1651. OSTERHOUT, W. J. V. A theory of injury and recovery. I. Experiments with pure salts. Jour. Gen. Physiol. 3: 145-156. 1920.—Continuing work and using methods previously described (see preceding entry), the writer has experimented on the effects of solutions of NaCl and CaCl₂ on the conductivity of tissue of *Laminaria Agardhii*. Assuming that changes occur in series $O \rightarrow S \rightarrow A \rightarrow M \rightarrow B$ and that the resistance of the tissue is proportional to the amount of M, equations are developed which make it possible to predict, after any length of exposure to solutions of NaCl or CaCl₂, the resistance of the tissue during the exposure as well as the resistance during recovery. The calculated data were found to agree very closely with the experimental data.—*Otis F. Curtis.*

1652. OSTERHOUT, W. J. V. A theory of injury and recovery. II. Experiments with mixtures. Jour. Gen. Physiol. 3: 415-429. 1921.—Equations which serve to predict injury and recovery as measured by electrical conductivity of tissues when placed in pure salts (see preceding entry) will also serve to predict the injury and recovery of such tissues when exposed to mixtures of the two salts.—*Otis F. Curtis.*

1653. OSTERHOUT, W. J. V. A theory of injury and recovery. III. Repeated exposures to toxic solutions. Jour. Gen. Physiol. 3: 611-622. 1921.—The equations previously used (see the preceding entries) may be used also to predict the behavior of tissues when transferred, with varying sequence, from sea water to solutions of the pure salts, or mixtures, and from thence to other solutions of pure salts or to sea water. It is suggested that explanations similar to the one advanced (see the 2 preceding entries) may be applied to other fundamental life processes.—*Otis F. Curtis.*

1654. SCHOENHOLZ, P., AND K. F. MEYER. The optimum hydrogen-ion concentration for the growth of *B. typhosus*, and *B. paratyphosus* A and B. Jour. Infect. Diseases 28: 384-393. 1921.—*B. typhosus* has a range of growth equivalent to P_H 5.0-5.6, with an optimum at P_H 6.8-7.0, in salt-free veal infusion broth. Large variations in the hydrogen-ion concentration about the optimum zone produce only slight effects on the growth of the organisms, while slight variations near the limiting concentrations produce a marked effect. *B. paratyphosus* A and B have a range of growth similar to that of *B. typhosus* but exhibit a greater tolerance for alkali.—*Selman A. Waksman.*

1655. SMITH, THEOBALD, AND DOROTHEA E. SMITH. Inhibitory action of paratyphoid bacilli on *Bacillus coli*. 1. Jour. Gen. Physiol. 3: 21-33. 1920.—Gas and acid formation by *B. coli* grown on lactose bouillon is normal when following 4-day cultures of a number of more or less distinct strains of the "true hog-cholera bacilli" (including also *Bacillus icteroides* and *B. suispestifer*). Acid formation is normal but gas formation is inhibited when following 4-day cultures of all "true paratyphoid and enteritidis types." The inhibiting effects of the latter types disappear after incubation of about 3 weeks, while the former types produce inhibition after about the same time. The authors suggest that the inhibition is due to some metabolic product, possibly an enzyme. The presence of large numbers of the bacteria themselves did not inhibit gas formation, while the liquid remaining after centrifuging did produce inhibition. This inhibiting agent can be removed by filtering through a Berkefeld filter, by heating to about 100°C., or by clearing with kaolin.—*Otis F. Curtis.*

SOIL SCIENCE

J. J. SKINNER, *Editor*F. M. SCHERTZ, *Assistant Editor*

(See also in this issue Entries 1101, 1109, 1124, 1147, 1153, 1257, 1398, 1404, 1416, 1417, 1619, 1621, 1642)

ACIDITY AND LIMING

1656. CONNOR, S. I. Liming in its relation to injurious inorganic compounds in the soil. *Jour. Amer. Soc. Agron.* 13: 113-124. 1921.—In 3 ways lime may act upon injurious inorganic compounds in the soil: (1) It neutralizes soil acidity; (2) it precipitates most injurious soluble salts which are found in acid soils; (3) it acts in an antagonistic manner toward excessive soluble salts which may not be precipitated. Aluminum, iron, manganese, boron, and zinc are harmful in a soluble form but are rendered less soluble and less injurious by lime. Aluminum toxicity is prevented by an abundance of phosphates. Active forms of silicates to a certain extent aid in precipitating aluminum salts.—*F. M. Schertz.*

1657. FISHER, E. A. Studies on soil reaction I. A résumé. *Jour. Agric. Sci.* 11: 19-44. *Fig. 1-6.* 1921.—The author discusses the importance of the soil reaction as a factor in soil fertility and reviews the theories of soil acidity. Methods of determining soil acidity are discussed and the problem of soil acidity is correlated with current physico-chemical conceptions of acidity in general. The ordinary titrimetric methods and the method of HUTCHINSON-MACLENNAN of measuring soil reaction and determining lime requirements are discussed.—*V. H. Young.*

1658. FISHER, E. A. Studies on soil reaction II. The colorimetric determination of the hydrogen ion concentration in soils and aqueous soil extracts. (Preliminary communication.) *Jour. Agric. Sci.* 11: 45-65. *Fig. 1-6.* 1921.—A discussion of the electrometric and colorimetric methods of H-ion determination is presented. A method for compensating for the turbidity of soil extracts is described. Soil samples were dried and extracts made from the dried soil. Centrifuged extracts, although somewhat turbid, were found to yield more constant results than clearer filtered extracts. Such solutions do not represent the actual H-ion concentration of the soil solution but rather of a solution obtained by shaking 1 part of soil with 2 parts of water for 1 hour. An attempt is made to correlate H-ion results with the lime requirements of the soil.—*V. H. Young.*

1659. LYON, T. L. The effect of liming on the composition of the drainage water of soils. *Jour. Amer. Soc. Agron.* 13: 125-130. 1921.—The author reports on the influence of lime on the sulphur, calcium, potash, nitrogen, and phosphorus content of drainage waters.—*F. M. Schertz.*

1660. ROBINSON, R. H. Acid soil studies I. A study of the basic exchange between soil separates and salt solutions. *Soil Sci.* 11: 353-362. 1921.—Soil separates of 4 acid Oregon soils were treated with 0.1 N solutions of potassium chloride, potassium nitrate, sodium chloride, potassium acetate, and calcium acetate. By the VERRICH and JONES method the lime requirement of these soils varied from 1500-20,800 pounds of calcium carbonate per 2,000,000 pounds of soil. The acidity of the different soil separates liberated by the action of a given salt solution was approximately the same. The so-called acidity liberated by potassium nitrate, potassium chloride, and sodium chloride was due mainly to iron and aluminum rendered soluble. The acidity produced by the acetates was due to acetic acid. The H-ion concentration of the different separates of the soil was constant.—*W. J. Robbins.*

1661. ROBINSON, R. H., AND D. E. BULLIS. Acid soil studies: II. Changes in calcium compounds added to acid soils. *Soil Sci.* 11: 263-267. 1921.—In an effort to determine why

some Oregon soils do not respond to lime treatment, pure calcium carbonate or calcium oxide was added to soils in pots and allowed to weather 1 year. A crop of barley was grown in the pots. At the end of a year samples were removed from the pots and the forms into which the calcium compounds had changed determined. The calcium was found chiefly combined with humus and easily decomposable silicates. Most of the calcium present in the acid soil which does not respond to lime was found combined as difficultly decomposable silicate.—*W. J. Robbins.*

GENERAL

1662. BECKLEY, V. A. The formation of humus. *Jour. Agric. Sci.* 11: 69-77. 1921.

1663. COLBY, G. E. A note on the use of anhydrite as a remedy for black alkali. *Monthly Bull. Dept. Agric. California* 10: 39-41. 1921.—Anhydrite was found to possess the same value as gypsum or land plaster as a chemical remedy for black alkali.—*E. L. Overholser.*

1664. FRED, E. B., AND AUDREY DAVENPORT. The effect of organic nitrogenous compounds on the nitrate-forming organisms. *Soil. Sci.* 11: 389-407. *Pl.* 1-2. 1921.—*Nitrobacter* was grown upon washed nitrite-agar and on slants of Nährstoff-Heyden agar with and without nitrite present. Microscopical examination showed that this organism does not reproduce in liquid cultures of water, urine, peptone-beef infusion, or Nährstoff-Heyden infusion. The last was non-toxic but beef infusion or peptone-beef infusion contained a non-volatile toxic substance, soluble in ether or alcohol. *Nitrobacter* will live 2-6 weeks in a 1 per cent solution of gelatine, peptone, casein, yeast water, or Nährstoff-Heyden, or in milk or distilled water. Gelatine, peptone, casein, skimmed milk, beef infusion, and beef extract do not affect the oxidation of nitrite; asparagin, ammonium sulphate, and urea decrease it; Nährstoff-Heyden increases it above that in water controls. Sealed agar slants of *Nitrobacter* were kept more than 1 year without serious injury to the oxidative power.—*W. J. Robbins.*

1665. HARDY, F. A preliminary investigation into the occurrence of different kinds of carbonates in certain soils. *Jour. Agric. Sci.* 11: 1-18. 1921.—Samples of marine silt from the foreshore of the N. W. coastal belt of the Wash were found to contain dolomite. Studies were made to ascertain the effect of dolomite on such processes as nitrification in which the neutralizing effect of a quick-acting base is essential. Culture experiments tended to strengthen the view that dolomite has a definite effect on nitrification, and this view was further strengthened by an investigation of the nature of the carbonate in soils of which the geological and agricultural history is known. A technique for the estimation of the easily decomposed ("Calcitoid") and more stable ("Dolomitoid") carbonates was developed. Marine silts may be expected to contain calcitoid and dolomitoid carbonate; other soils do not generally contain the latter type of carbonate. Cultivation reduces the carbonate content of the soil, especially of calcitoid soils. Acidity may occur in soils containing both types of carbonates when the total carbonate content is greater than the amount considered necessary to prevent acidity. The reason for this is that the dolomite types of carbonate are not easily affected by the weak acids of the soil.—*V. H. Young.*

1666. HARDY, F. Substitutes for pen manure. *Agric. News [Barabados]* 20: 21. 1921.—The author discusses various materials used in India to replace pen manure, such as oil cake, green manures, top soil from virgin forests or high jungles, earth from scrub jungles, earth from grass land, and tank silt. Not many of these substances are available to the average West Indian planter, to whom the author suggests the employment of scrub from waste places, rank herbage (including tall grasses), road sweepings, trimmings of trees, rotted lime or orange skins and seeds, waste green stuff from the banana, cacao and coconut crops, filter and scums from sugar factories, and cotton seed meal.—*J. S. Dash.*

1667. HIBBARD, P. L. Sulfur for neutralizing alkali soils. *Soil Sci.* 11: 385-387. 1921.—The addition of sulphur to alkali soils was found to reduce the alkalinity and to improve the conditions for plant growth.—*W. J. Robbins.*

1668. JOHNSON, MAXWELL O., AND KIM A. CHING. Report of the Chemical Division. Hawaii Agric. Exp. Sta. Rept. 1919: 40-44. 1920.—A progress report on fertilizer experiments with bananas and pineapples is presented. In spraying pineapples on manganese soil an application of as much as 3,000 pounds of iron sulphate to the acre was unsuccessful in preventing chlorosis, while considerably less than 50 pounds per acre applied to the pineapple leaves promptly checked the chlorosis.—*J. M. Westgate.*

1669. MARCHAND, B. DE C. The soils of Natal and the Transvaal. II. The soils of the Transvaal. South African Jour. Indust. 4: 181-187. 1921.

1670. MASCHHAUPT, J. G. Onderzoek naar de oplosbaarheid in met koolsuur verzadigd water van het in Thomasphosphaat en enkele andere fosphaten aanwezige phosphorzuur. [Investigation on the solubility of the acid phosphate contained in Thomas slag and other phosphates in carbon dioxide saturated water.] Verslag. Landbouwk. Onderzoek. Rijkslandbouwproefsta. 23: 57-84. 1919.

1671. PATE, W. F. II. Results of Phos-pho-germ, experiments conducted during 1919-1920. Bull. North Carolina Dept. Agric. 1921: 14-16. May, 1921.—Tests with rye, corn, and cotton show that the use of Phos-pho-germ gives little or no increase in crop yields.—*F. A. Wolf.*

1672. SURRE, G., and R. VAILE. Some notes on the "dry bag" soils of the foothill districts, Tulare County, California. Monthly Bull. Dept. Agric. California 10: 41-46. 1921.—It is believed that the shrinkage and the resulting cracks and dry-bag structure of certain adobe soils are mainly due to the presence of large amounts of plastic or colloidal clay-like material, with a corresponding lack of quartz and of the coarse resistant minerals in quantity to act as "fillers" and thus reduce the otherwise inevitable great shrinkage. Experiments indicate that it is highly desirable to permit the soil to crack somewhat after irrigation before practicing any tillage.—*E. L. Overholser.*

1673. WILLIAMS, C. C. The soils of Natal and the Transvaal. I. The composition of Natal soils. South African Jour. Indust. 4: 177-181. 1921.

TAXONOMY OF VASCULAR PLANTS

J. M. GREENMAN, *Editor*

E. B. PAYSON, *Assistant Editor*

(See in this issue Entries 1145, 1277, 1311, 1486, 1487, 1496, 1503, 1603)

MISCELLANEOUS, UNCLASSIFIED PUBLICATIONS

B. E. LIVINGSTON, *Editor*

S. F. TRELEASE, *Assistant Editor*

1674. ANONYMOUS. Commission internationale pour l'exploration scientifique de la mer Méditerranée. Conference de Madrid, 17-20 Nov., 1919. [International commission for the scientific exploration of the Mediterranean Sea. Conference in Madrid, Nov. 17-20, 1919.] Commission Internat. Exploration Sci. Mer Méditerranée Bull. 1. 24 p. 1920.—A meeting was called of delegates from the countries bordering on the Mediterranean, with a view to organizing for a scientific study of that sea. The organization comprises a central bureau to coordinate the work of the stations in each country. The publication of the results will be largely in the hands of the central bureau, of which the Prince of Monaco is the president. Publication will be in English, Spanish, French, Greek, and Italian. Memoirs on oceanography are contemplated, and an atlas of the flora and fauna of the Mediterranean will be begun with the edible animals. The stations are to have uniform recording instruments.

and are to study the biology and geographical distribution, of the useful animals, the marine plants, and the plankton.—*T. C. Frye*.

1675. BARNARD, J. E. Microscopy with ultra-violet light. *Sci. Amer. Monthly* 3: 219-220. 5 fig. 1921. [Reproduced from *Nature* 106: 378-381. 1920 (see Bot. Absts. 8, Entry 2255).]

1676. BEY, CHARLES AUDEBEAU. Utilization des tiges de diverses plantes annuelles en vue de la production de l'énergie mécanique nécessaire aux travaux agricoles de la vallée du Niger. [The utilization of the stems of annual plants for the production of mechanical energy necessary to the agricultural activities in the valley of the Niger.] *Compt. Rend. Acad. Sci. Paris* 172: 764-766. 1921.—The combustion of plant products as a source of energy is considered. It is found that waste parts of cotton and other crops can be used in this way.—*C. H. Farr*.

1677. BROWN, W. H. Wild food plants of the Philippines. *Bur. Forest. Philippine Islands Bull.* 21. 165 p., 81 pl. 1920.—The species are arranged in botanical sequence under families and genera. It is the most comprehensive work of its kind so far issued in relation to the Philippine flora.—*E. D. Merrill*.

1678. CREVOST, C., ET C. LEMARIÉ. Plantes et produits filmenteux et textiles de l'Indochine. [Plant fiber and textile products of Indochina.] *Bull. Econ. Indochine* 23: 209-231, 406-433. 1920.—A continuation of the series (see Bot. Absts. 6, Entry 1539) covering the palms, bamboos, Cyperaceae, *Pandanus*, and miscellaneous vines of various families.—*E. D. Merrill*.

1679. JURITZ, CHAS. F. Raw materials for industrial alcohol production. *South African Jour. Indust.* 4: 167-173. 1921.

1680. NICHOLS, GEORGE E. [Rev. of: HEDRICK, U. P. Sturtevant's notes on edible plants. *Rept. New York Agric. Exp. Sta. (Geneva)* 1919²: 17-686. 1920 (see Bot. Absts. 8, Entry 862).] *Torreyia* 21: 50-52. 1921.

1681. VON BLON, J. L. California's seaweed industry. *Sci. Amer.* 123: 445, 458. 2 fig. 1920.—The article concerns itself with the manufacture and uses of agar-agar.—*Chas. H. Otis*.

1682. WEST, A. P., AND W. H. BROWN. Philippine resins, gums, seed oils, and essential oils. *Bur. Forest. Philippine Islands Bull.* 20. 230 p., 73 pl. 1920.—The authors present a comprehensive treatise, from both a botanical and a chemical standpoint. Most of the species considered are illustrated.—*E. D. Merrill*.

1683. WILLIAMS, S. G. Manila hemp. *Sci. Amer. Monthly* 3: 255-257. 8 fig. 1921.—A brief account is given of primitive methods of obtaining fiber from the banana plant abacá (*Musa textilis*), as practiced in the Philippines.—*Chas. H. Otis*.

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